THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXVI. No. 637.] LONDON, JULY 27, 1875. [27TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis—10,000 cubic feet of gas per ton of coal; 28-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1823. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES. CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GENUINE TORBAY PAINT
AND
SPECIAL GASOMETER PAINT
(Mixed ready for use).
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.
STEVENS & CO.,
(SUCCESSORS TO SAMUEL CALLEY. ESTABLISHED 20 YEARS.)
21, GT. WINCHESTER ST., LONDON.
WORKS: BRIXHAM, TORBAY.

PROUD'S
SPECIALITIES IN WOOD GRIDS
FOR
PURIFIERS & SCRUBBERS
MADE FROM THE BEST QUALITY
OF
WELL-SEASONED PLANKS.
BROOKFIELD WORKS,
103, ICKNIELD STREET EAST,
BIRMINGHAM.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.
JOS. COWEN & Co. are the only Manufacturers of FIRE-BRICKS and CLAY RETORTS at BLAYDON BURN.

JOHN RUSSELL AND CO.,
THE WEDNESBURY TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
WAREHOUSES:
69, UPPER THAMES STREET;
COMMERCIAL STREET, SPITALFIELDS;
5, CHARLES STREET, SOHO; and
16, SOHO SQUARE,
} LONDON
35, 36, 37, & 39, GRANBY ROW, MANCHESTER.
J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
Lists may be obtained on application to
69, UPPER THAMES STREET, LONDON.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
OF
FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
ESTABLISHED 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM.
MANUFACTURERS OF
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
LONDON AGENT—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

J. & H. ROBUS,
CONTRACTORS
FOR THE
ERECTION OF NEW & REMODELLING OF EXISTING GAS-WORKS.
RETORT-SETTING A SPÉCIALITÉ.
RETORTS SET, AND GUARANTEED TO BURN OFF A CERTAIN AMOUNT OF COAL, OR ELSE NO MONEY TAKEN FOR THE CONTRACT.
PLANS ON APPLICATION.
Retort-Setters sent to all parts of Europe and America.
Address, J. and H. ROBUS,
BELL GREEN, CATFORD, LONDON, S.E.

THE
NITSHILL COMPANY'S
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.

GEORGE GLOVER & CO.,
PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW; AND 30, LANCASTER AVENUE, MANCHESTER.

G. G. and Co. have received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: 157, UPPER THAMES STREET, E.C.

LIVERPOOL: No. 63, Paradise Street. | PARIS: No. 38, Rue du Chateau d'Eau.

MANCHESTER: Barlow's Croft, Chapel Street, Salford. | LILLE: No. 38, Rue Grande Chaussee.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.

THE

LANCASHIRE GAS-METER COMPANY,

LIMITED,

FALCON STREET, OLDHAM,

MANUFACTURERS OF

GAS-METERS, GOVERNORS, EXPERIMENTAL GASHOLDERS, &c.

HENRY THOMAS, Managing Director.

GAS PURIFICATION & CHEMICAL Co., LIMITED.

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY

OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON, } Joint Managing Directors.

TRADE MARK

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

London Agent: W. G. DAVIS, 2, BRABANT COURT, PHILPOT LANE, E.C.

JOSEPH AIRD,

WELLINGTON TUBE-WORKS, TIPTON, STAFFORDSHIRE,

MANUFACTURER OF

EVERY DESCRIPTION OF TUBING, GAS, STEAM, HYDRAULIC TUBES AND FITTINGS,
EITHER BLACK, GALVANIZED, OR ENAMELLED HOT WATER TUBES AND FITTINGS,
CORE BARS, COILS, COCKS (IRON OR BRASS),
CHANDELIERS, &c., GAS-FITTERS' TOOLS, GAS TONGS, STOCKS, TAPS, DIES, &c., &c.,
HANDRAIL TUBINGS, IRON AND BRASS, PLAIN OR TWISTED,
TELEGRAPH TUBES OR POLES, &c., &c.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

To Messrs. John Wright and Co., Essex Works, Birmingham. *Crystal Palace District Gas Company, Lower Sydenham, S.E.*

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.

Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,
Has all the appearance of a Bright Fire.
PRICE from 32s.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

M. SELIG JUNIOR AND CO.,

IMPORTERS OF

AMERICAN AND OTHER FOREIGN TOOLS AND MACHINERY,

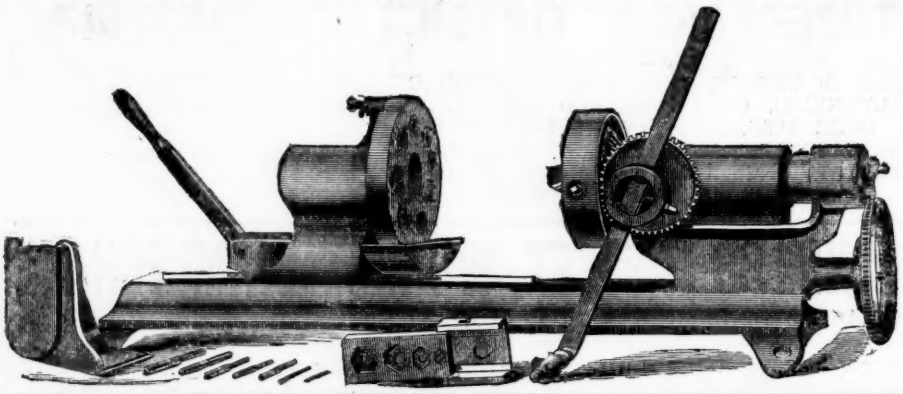
WHOLESALE AND EXPORT MACHINERY MERCHANTS,

SOLE EUROPEAN AGENTS FOR THE

"TANITE" COMPANY'S SOLID EMERY WHEELS AND MACHINERY,

85, QUEEN VICTORIA STREET, LONDON, E.C.

THE "LIGHTNING" HAND AND POWER SCREWING AND TAPPING MACHINES.



They finish their work at one cut.

Nuts and bolts threaded with them always correspond, without trying and fitting.

The dies are adjustable for wear.

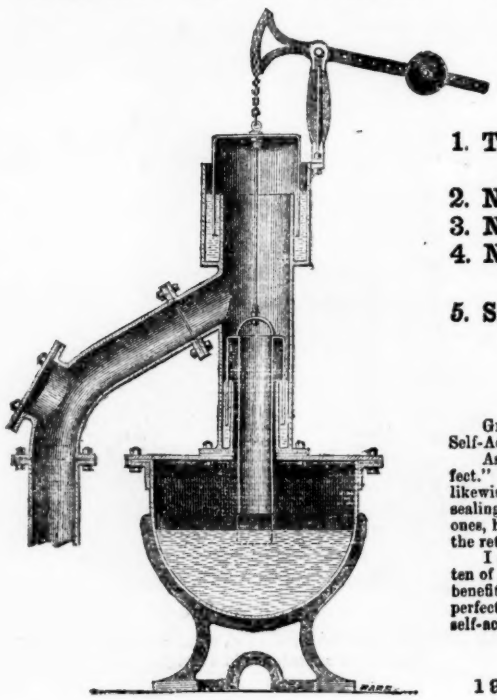
They thread 30 $\frac{3}{4}$-in. bolts, and tap 30 $\frac{3}{4}$-in. nuts, in 40 minutes—a day's work by hand.

They may be used, if pipe-dies ordered, for threading pipes as well.

SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

TESTIMONIAL.

Metropolitan District Asylum, Caterham, Surrey, Dec. 14, 1874.

MESSRS. CHANDLER AND STEVENSON.

GENTLEMEN,—I have much pleasure in bearing testimony to the complete working of your "Patent Self-Acting Dip-Pipes," which have now been in constant operation over three months.

As regards the action of the apparatus, I can describe it no better than by calling it "simply perfect." Immediately the retort is charged and the lid secured, the small holder rises, which lifts the Dip; likewise the instant the gas is permitted to escape at the mouthpiece the holder falls, thus perfectly sealing the Dip. I am fully convinced of the superiority of these Self-Acting Dips over Non Self-Acting ones, having experienced the fact that stokers do occasionally neglect to unseal the Dip after charging the retort, thereby causing a waste or loss.

I feel that it is quite unnecessary for me to say more on the subject, excepting that, having had ten of Messrs. Chandler's Dip-Pipes in use more than one year, and having experienced the great benefits derived thereby, inasmuch as the yield of gas from the coal is greatly increased, and the retorts perfectly free from carbon and other advantages, and seeing that the same Dip has been made perfectly self-acting by the second patent, I feel convinced that this is the right thing.—Yours obediently,

W. CRICKMAY, Resident Engineer.

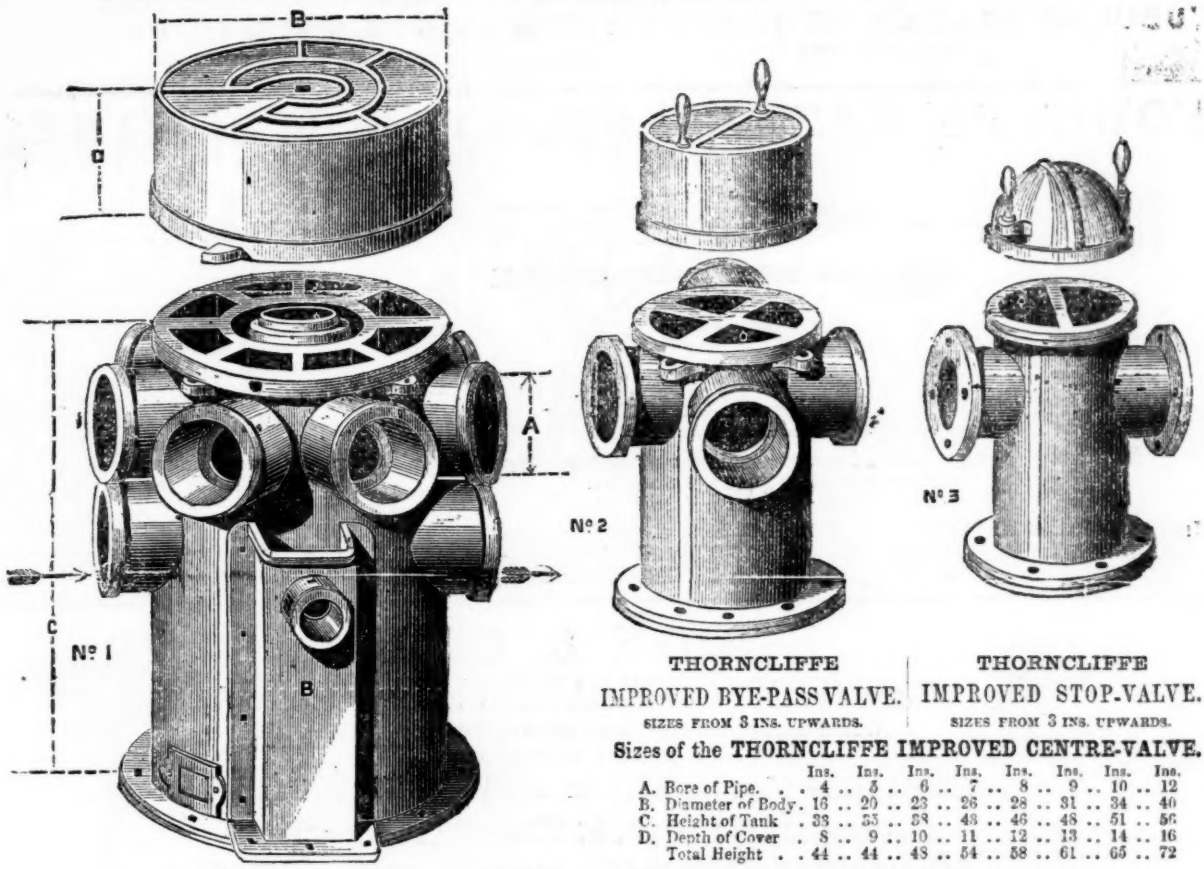
For terms of use and cost, apply to Mr. G. W. STEVENSON,

19, GREAT GEORGE STREET, WESTMINSTER.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.



THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	33 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

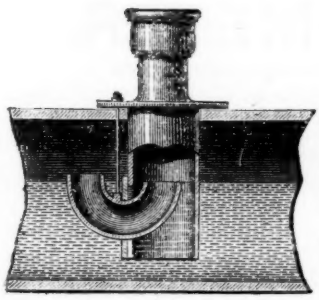
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



Dip-Pipe, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

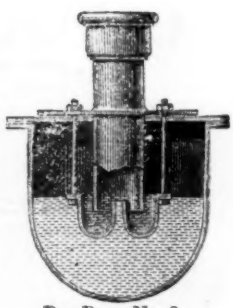
By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.



Dip-Pipe, No. 2.

FOR PRICES, TESTIMONIALS, &c., APPLY TO

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS, LIMITED,

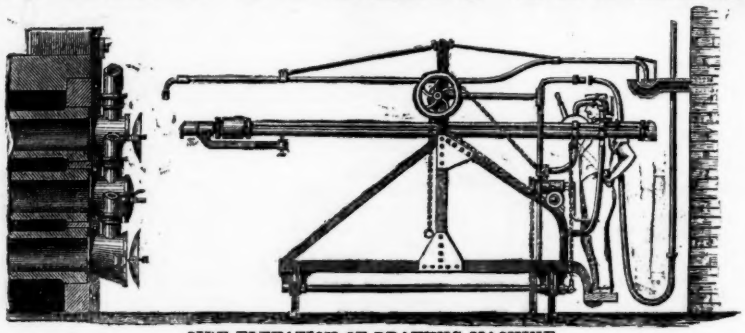
MANUFACTURERS OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

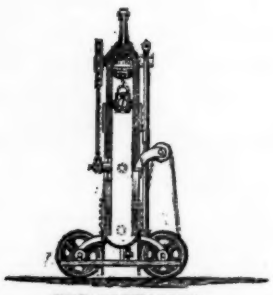
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

FOULIS'S PATENT STOKING MACHINE.



SIDE ELEVATION OF DRAWING MACHINE.



END ELEVATION.

(The Charging Machine will be Illustrated in next week's Advertisement.)

Makers: **TANGYE BROTHERS** and **HOLMAN**, London and Birmingham; **ADAM WOODWARD** and **SON**, Manchester; **ROBERT LAIDLAW** and **SON**, Glasgow; **MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT**, Kalk bei Deutz; Or all particulars may be had from **JAMES WOTHERSPOON**, 31, St. Vincent Place, Glasgow.

HODGE & CO.'S

IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

100, HATTON GARDEN, LONDON.

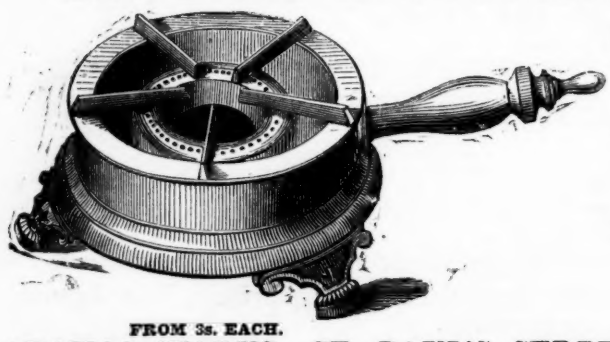
Drawings and Prices upon application.

PRIZE MEDALS—1862, 1867, 1871, 1874.

SIDNEY LEONI AND CO.,

SOLE LICENSEES AND AGENTS FOR GREAT BRITAIN FOR

GIROUD'S PATENT RHEOMETER.



FROM 3s. EACH.

This Instrument is easily fixed under any Burner; it regulates the volume of Gas to be consumed, notwithstanding the Size of the Burner or the Variation of Pressure.

Full particulars on application, also Pamphlets on the "ADVANTAGES OF COOKING AND HEATING BY GAS." With Illustrations, &c., of the latest and most improved GAS KITCHENERS, GRILLERS, COOKING STOVES, REGISTERED BOILING STOVES (See Margin); also the NEW SAFETY PATENT TUBULAR GAS BOILERS.

LIBERAL TERMS TO THE TRADE.

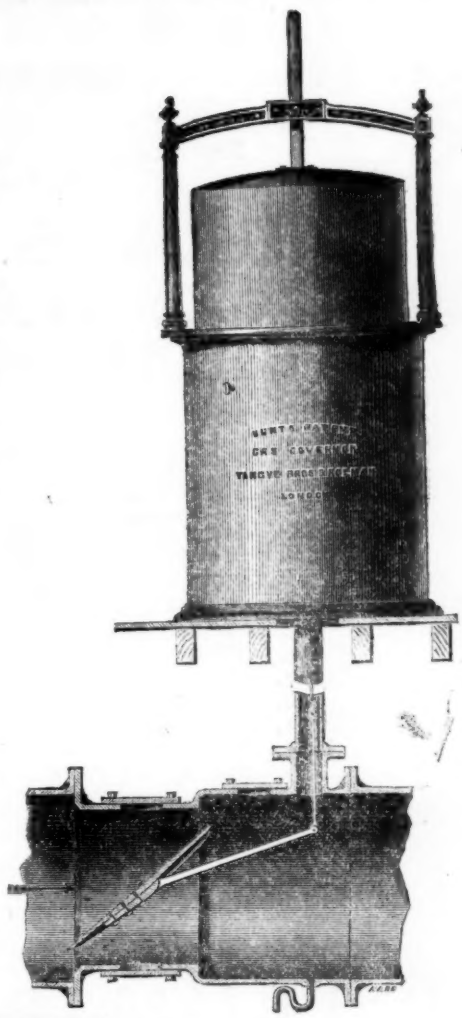
ADAMAS WORKS, ST. PAUL'S STREET, NEW NORTH ROAD, LONDON, N.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by several leading Gas Companies, among whom are the following:—

The Gaslight Co.—two 36 in. at Blackfriars.
" " a 36 in. at Goswell Road.
" " a 24 in. at "
" " a 24 in. at Whitechapel.
" " an 18 in. at Bow Common.
" " a 24 in. at Beckton.
" " a 6 in. at "
The London Gas Co.—a 24 in. at Nine Elms.
" " an 18 in. at "
" " an 8 in. at "
The Exeter Gas-Works—a 24 in.
" Abergavenny Gas-Works—a 10 in.
" Birmingham Gaslight Co.—an 8 in.
" Monmouth Gas-Works—an 8 in.
" Devonport Gas-Works—an 8 in.
" Cannes Gas-Works—an 8 in.
" Mentone Gas-Works—an 8 in.
" Rochdale Gas-Works—a 4 in.
" Imperial Gas Co., a 12 in at Great Cambridge Street.

TESTIMONIAL.

The Gaslight and Coke Company, 9, Water Street, New Bridge Street, Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

VIENNA EXHIBITION, 1873.—The highest prize and only Medal "for Progress" for Direct-Acting Steam Pumps for general purposes was awarded to TANGYE BROTHERS AND HOLMAN, Engineers, London, for

THE "SPECIAL" DIRECT-ACTING STEAM PUMPS.

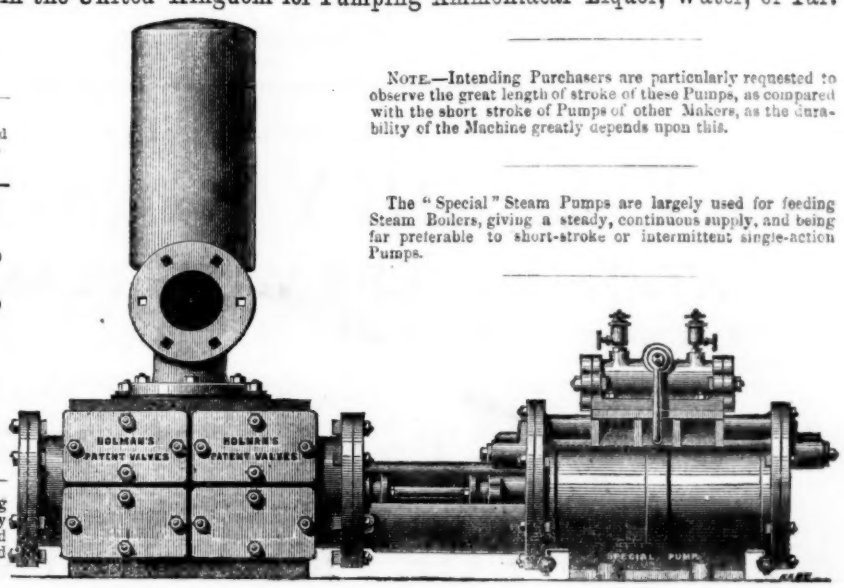
Upwards of 12,000 have been sold in England and America.

In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4*	2	9	815	18
3	3	9	1,830	18
5*	3	12	1,830	22 10
4	4	12	3,250	25
6*	4	12	3,250	30
5	5	12	5,070	32 10
7*	5	12	5,070	40
6	6	12	7,330	40
8*	6	12	7,330	50
7	7	12	9,750	50
10*	7	12	9,750	65
8	8	18	13,000	65
10	9	18	16,500	80
10	10	24	20,000	100
12	12	24	30,000	140

* These sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance piece between steam and pump cylinder at a small extra cost.



NOTE.—Intending Purchasers are particularly requested to observe the great length of stroke of these Pumps, as compared with the short stroke of Pumps of other Makers, as the durability of the Machine greatly depends upon this.

The "Special" Steam Pumps are largely used for feeding Steam Boilers, giving a steady, continuous supply, and being far preferable to short-stroke or intermittent single-action Pumps.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

CONTENTS.

	Page
Circular to Gas Companies:—	
The Position of the Regulations Bill	137
Progress of the Commercial Company's Bill	137
The Conspiracy and Protection to Property Bill	137
The Worthing Gas Company's Act	138
The Appropriation of Gas Profits at Greenock	138
The Gas Committee of Forfar and their Dinners	138
The Evidence of Messrs. Reilly and Pattison	138
Water and Sanitary Notes:—	
The Earl of Camperdown and the Metropolitan Water Companies	138
The Metropolitan Board of Works and the Extinction of Fires	138
Extraordinary Water Analyses	138
Communicated Articles:—	
On the Manufacture of Gas from Carburetted Peat	139
Société Technique de l'Industrie du Gaz en France	140
Parliamentary Intelligence:—	
Progress of Bills in House of Lords	140
Progress of Bills in House of Commons	140
House of Lords Committee—Worthing Gas Bill	141
House of Commons Committee—Metropolis Gas Companies Bill	145
Legal Intelligence:—	
Glasgow Court of Session—The Water Supply of Galashiels	150
Southwark Police Court—Singular Dispute as to Gas-Rent	150
Miscellaneous News:—	
Our Water Supply	140
Sale of Gas and Water Companies Shares at Dorking	150
Meeting of the Norwich Water-Works Company	151
Forfar Gas Corporation	151
North British Association of Gas Managers	151
Metropolis Water Supply	156
Iron and Coal Trades of Sheffield, South Yorkshire, and North Derbyshire	156
Iron and Coal Trades of South Staffordshire and East Worcestershire	156
Iron and Coal Trades of Lancashire	156
Coal and General Trade of the North	156
Trade Notes from Scotland	157
Sheffield Water-Works Company	157
Reductions in the Price of Gas	157
Huddersfield Water Supply	157
Taunton Gas Company	157
Leicester Water-Works Company	157
Carnforth Gas Company, Limited	157
Galashiels Gas Company	157
Register of New Patents:—	
Spice, R. P.—Gas-Making	157
Jones, H. L.—Flushing, Disinfecting, and Deodorizing	157
Furness, G.—Cocks and Valves	158
Wallace, J.—Gas-Burners	158
Forbes, Rev. G. H.—Cement	158
Westwood and Wright—Stop-Valves	158
Lynde, J. H.—Water-Waste Preventers	158
Trotter, H.—Lighting and Extinguishing Gas	158
Huggett, J. A.—Ball-Valves	158
Parkes, S. H.—Lamps	158
Applications for Letters Patent	158
Grants of Provisional Protection	158
Notices to Proceed	158
Patents which have passed the Great Seal	158
Patents which have become void	158

NOTICES TO SUBSCRIBERS.

SUBSCRIPTIONS.

Yearly	21s. in advance.
"	25s. on credit.
Half-Yearly	10s. 6d. in advance.
"	12s. 6d. on credit.

Vol. XXV. (first half of 1875) is now ready, bound in cloth, gilt letters, price 18s. Cloth cases for binding may be obtained on order from any bookseller, or from the Publisher.

All communications for the Editor, remittances for subscriptions, and orders for advertisements should be addressed to the Publisher, William B. King, 11, Bolt Court, Fleet Street, London, E.C.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 27, 1875.

Circular to Gas Companies.

THE fate of the Regulations Bill in the House of Commons is still undecided and doubtful. So long as it remains on the order-book, there is a standing menace to the companies, which must not be disregarded. The promoters of the measure are extremely anxious to acquire for it the *prestige* which would attach to it, in consequence of a successful passage through the lower House, and this must, in any way possible, be prevented. A considerable tax will be laid on the energy and vigilance of the opponents, but, in consideration of the magnitude of the issues at stake, we are certain that this will be cheerfully contributed; and we shall continue to hope for a result favourable to our cause. Should, however, the worst happen in the House of Commons, all expectation of the Bill becoming law this session may be abandoned. Public business in the House of Lords is still largely in arrears, and the measures which remain for consideration are calculated to occupy all the time their lordships can spare for legislative work amid the closing festivities and sports of the season. We think, then, that we may speculate with some certainty on the loss of the measure for the present session.

The Bill of the Commercial Company is now, or rather was, at the mercy of Lord Redesdale, for it was to have been before his lordship yesterday as an "unopposed" measure. This result appears to have happened in consequence of the committee, who listened to the feeble opposition made, having declined to make a report to the House. The objections which Lord Redesdale would make to the Bill may be readily anticipated. It may be expected that, following consistently his usual course, he will strongly oppose the arrangements for raising the additional capital which the Bill proposes. These constitute an extraordinary innovation, and, if it be allowed, we shall have advanced a step towards carrying out a suggestion which we rather think has been made—viz., that the share capital accounts of the companies should be closed as soon as their present powers are exhausted, and that, for the future, they should only be allowed to raise money by way of loans. We have a great admiration of "thoroughness," and, if popular demands are to be conceded, we would rather see it done effectually, as here suggested, than in the half-and-half way proposed by the Commercial Company.

We are bound to say that we are not at all satisfied with the result, or no result, of the opposition made to the Commercial Company's Bill before the committee of the Lords. No doubt the decision as to the *locus standi* of the several petitioners was in strict accordance with parliamentary precedent, still we know that great injustice may be done by strictly following precedent. By the Bill before the committee, the Commercial Company were setting a most pernicious example. They had associated themselves with the other companies in opposition to the general measure in the House of Commons, but no sooner was that measure assented to by the committee, than the company dissociated themselves from the opposition and accepted the provisions they had just before fought against. By that act they virtually said that they considered the provisions fair and reasonable, and left to the other companies the *onus* of further opposition, and the obloquy it will involve. It is true that it does not follow, as a matter of course, that provisions accepted by the Commercial Company will be forced upon all the other companies. We know that the Imperial Company in 1869 successfully resisted the imposition of conditions which had been accepted by the Chartered Company the year before; and we have a strong belief that next year the outstanding companies will be able to make terms very different to those it is now sought to force upon them. No doubt the directors of the Commercial Company see their way to maintain their dividends under the new restrictions; but all the other companies do not, and it is extremely difficult to convince a parliamentary committee that one company is not circumstanced exactly as another. For these and other reasons, then, we must regret that the Commercial have set what we venture to call a pernicious example. They could well have waited to see what would turn up in another year. They have no such urgent need of new capital and fresh works as would make the delay of another twelve months of great moment. We shall wait with some curiosity to learn the ultimate fate of their Bill. It is very unusual for a private measure to be thrown out on a third reading; such a thing has happened, however, and may happen again.

Mr. Secretary Cross's Conspiracy and Protection to Property Bill is not allowed a smooth passage through the House of Commons. We have before expressed a general assent to that particular provision which concerns gas and water companies, and may here announce a more complete agreement with clause 4, as it now stands. The clause begins, "Where a person em-"ployed by a municipal authority, or public company, or by any "company or contractor" charged with the duty of supplying any place with gas or water, "*wilfully and maliciously* breaks a "contract of service with that authority," &c., "knowing that "the probable consequences of his so doing . . . . will be to "deprive . . . . that place of gas or water," he shall, on conviction, be liable to fine or imprisonment, with or without hard labour. We must confess that we do not see the ambiguity which *The Times* asserts to exist in these words. In the first place, the word "person" obviously includes any one in the employ of the company or authority, be he manager, engineer, stoker, or turncock. In the next place, the introduction of the word "maliciously" clearly shows that *malice* is intended to be an essential ingredient in the more serious offence. To our minds, the words are so clear in their intention, that even a Spalding parson might be expected to interpret them aright. The clause is meant to prevent a sudden strike of gas stokers, with the malicious design of throwing a whole town into darkness. In like manner, if a manager or engineer, at a critical moment, suddenly and maliciously quitted his post, there can be no doubt that, under the actual wording of the clause, he too would be liable to imprisonment with hard labour.

Much needless discussion, showing the wonderful ingenuity of the legal mind, took place respecting the punishments to be allotted to persons who break contracts other than "contracts of "service." Sir William Harcourt says that the Bill will allow any "contractor" (for materials or maintenance) to break his contract with impunity, because it was not a contract of service. Of course, he knows a great deal better, but it suits his purpose to

say so just now, trying to do the best he can for his party with the working classes. The person who made a contract to supply a town with gas at 4s. per 1000, and then said, "Unless you "give me 5s. I will cut off the gas," would be very summarily dealt with by a court of equity, if there be such a thing in this country, and would further, we should think, be liable to heavy damages if he should cut off the gas. Even Mr. Whalley was sensible enough to see the distinction between a "contractor" and a person under "contract of service."

We have already noticed the success of the Worthing Gas Company in obtaining a maximum price of 6s. 6d. per 1000, with, of course, additional capital and enlarged limits of supply. The Act will be noticed again when we give our usual parliamentary summary; we need only mention now that the Local Board are moaning over the expenses they have incurred in opposition, and that Worthing consumers are regretting the expense the company were put to, since they (the consumers) will necessarily have to repay it. The company, we should mention, were willing to accept a lower maximum than that granted by the Lords; but the Local Board forced a contest, with the result we have stated. The provincial companies, we may remark, have, on the whole, succeeded excellently well in Parliament this year, and this fact should encourage the metropolitan companies to renewed vigour in opposition next year.

In general, Scottish municipal gas undertakings are managed much in accordance with the principles which we consider just, but an exception is presented in the case of Greenock. It is understood that a considerable profit has been made on the gas undertaking during the past year, and it is now a question how it shall be disposed of. A rate of 1s. 9d. in the pound is not, it seems, sufficient to cover the expenses of the Police Board, and it is coolly proposed that the charge for gas for the next year shall remain as at present, 5s. per 1000, and that the profit shall be handed over to the Police Board. We are glad that a remonstrance is made on the part of the gas consumers, who rightly contend that "each herring ought to hang by its own tail," which we may accept for the Scottish translation of a dictum of John Stuart Mill's, which we have quoted more than once.

Writing of Scottish affairs reminds us that the Gas Committee of the Municipality of Forfar are in bad odour with some of their fellows in the Corporation. The Gas Committee have been in the habit of dining once a year, and wish to have another dinner. Some of the members, who were not, possibly, invited to the dinner, object to the expense, and thereupon occurs a scene in the council. Now we say emphatically that the Gas Committee of a Corporation, whose gas undertaking is a success in its way, deserve a dinner, and if the Forfar committee wish to fortify their case, we recommend them to write to the Gas Committee of the Corporation of London, who do not manage an undertaking, but only incur expenses, and ask them whether they consider a little over £17 an immoderate charge for an annual entertainment.

We publish to-day the evidence of Mr. F. S. Reilly and Mr. Pattison, two of the Revising Commissioners, given before the committee on the Regulations Bill, and we invite our readers particular attention to it. Our space is exhausted, and we do not intend to make any comments to-day. In speculating on the nature of some possible future general legislation, the evidence of Mr. Reilly cannot be passed over. The select committee this year evidently overlooked all but that part of it which went to show that Mr. Reilly considered that the revision clauses did not protect the consumer. The practical suggestions made at the invitation of the committee were entirely disregarded. We consider them, however, of sufficient importance to deserve a separate notice, which, under present circumstances, we may reserve for another issue.

[Since the above was written, we have learned that Lord Redesdale has passed the Bill of the Commercial Company, with some amendments, of the nature of which we are not yet informed.]

Water and Sanitary Notes.

The Earl of Camperdown was, we hope, satisfied with the explanation he received as to the power of the water companies to raise their rates if a revaluation increases the assessment. The natural effect of a revaluation, Lord Aberdare said, is to raise the value of the houses in particular districts, and these districts, we have little doubt, will include the greater part of the metropolis. The companies will thus obtain power to make a considerable addition to their rental, and the power will, probably, be exercised, for most are a long way from getting their 10 per cent. We are glad that the question of the transfer of the undertakings to some local authority was brought up on the occasion, inasmuch as it elicited from the Marquis of Salisbury the remark that to anticipate an early realization of the notion with respect to the metropolis was Utopian. The noble marquis knows full well that London does not at present possess an authority which could be safely trusted with the administration of such a vast business as the conjoined water undertakings. Earl Grey has, we rather think, given some attention to the question of a municipal constitution for the metropolis; and, if he really wish to see the water supply taken out of the hands of the companies, he will best promote that end by employing his leisure in elaborating a scheme for the municipal government of London.

The chairman and a few members of the Metropolitan Board of Works have had an "outing" to Manchester and Liverpool, to see the arrangements in those cities for the extinction of fires. They saw, of course, what can be done with well supplied hydrants, and they could have seen the same, without the trouble of their journey, if they had put a few hydrants on the constantly charged mains of several of the London companies. Our readers have been repeatedly told how many miles of mains in the metropolis are now constantly charged under a pressure, in some districts, in excess of that obtained at Manchester; and, but for the obstinacy of the Metropolitan Board and other authorities, the whole of London might be supplied on the constant system. It is the object of the Metropolitan Board, however, to throw discredit on the companies, and for that reason they put every possible obstacle in the way of the companies doing that which the Board profess is their great desire to accomplish. Now that they have been told, on high authority, that the notion of their getting possession of the water undertakings is Utopian, the Board may, perhaps, somewhat alter their tactics.

The Government, we see, assented to Lord Roseberry's motion, referred to in our last; so that, in the course of another year, we shall probably see some very useful information on the vexed question of the disposal of sewage.

Perhaps, for those who can appreciate the fun, there is no more amusing reading to be found than some reports of medical officers of health that appear in the provincial papers. The Town Council of Huntingdon are about to erect works for the supply of water to the borough; a very proper enterprise, for the success of which they have our best wishes. But when a Town Council start water-works, it is, of course, of importance to show that the private wells from which the inhabitants draw their present supply are polluted, and ought to be closed. Accordingly, the medical officer of health for Huntingdon was directed to report on the water from some private wells, and we here append the results of his analyses. The only hesitation we have in publishing these results arises from a doubt on our minds as to whether the local reporter copied the original document, or took shorthand notes as it was read. In the belief, however, that the reporter had access to the document, we present the analyses for the amusement and astonishment of our readers:—

The following are two examples of the quality of Huntingdon well water. If required, I can multiply examples almost indefinitely:—

From ——— Yard.

Colour—pale bluish green. Smell—very offensive after standing.

Organic or volatile matter	63·56	grains	per gallon.
Inorganic matter—			
Carbonate of lime	16·00	,,	,,
Chloride of sodium (salt)	20·83	,,	,,
Sulphate of alumina	25·00	,,	,,
Lead	None.		
Iron	Slight traces.		
Other inorganic matter	6·67	grains	per gallon.
Total inorganic matter	68·5	,,	,,
Total solid matter	132·06	,,	,,
Nitrogen as ammonia	0·0230		
Nitrogen as albumenoid ammonia	0·0300		

(Totally unfit for domestic use.)

From ——— Yard.

Colour—dark olive green. Smell—none. Suspended matter—none.

Organic or volatile matter	28·06	grains	per gallon.
Carbonate of lime	Moderate.		
Chloride of sodium (salt)	45·28	grains	per gallon.
Alumina	Traces.		
Lead	Very slight traces.		
Other inorganic matter	7·02	grains	per gallon.
Total inorganic matter	52·30	,,	,,
Total solid matter	80·36	,,	,,
Nitrogen as ammonia	0·7	,,	,,
Nitrogen as albumenoid ammonia	0·055	,,	,,
Oxygen absorbed by standard solution of permanganate of potash	0·138.		

(Totally unfit for use.)

Comment on the above is unnecessary for our chemical readers, and it would take too much of our space to explain the absurdities to the general reader. We may observe, however, that no case so gross as this has ever before come under our observation, and it says something for the intelligence of Huntingdon, that when a motion was made in the Town Council for the reappointment of this wonderful analyst for another year, no one could be found to second it.

Communicated Articles.

ON THE MANUFACTURE OF GAS FROM CARBURETTED PEAT.

(MARTIN'S PROCESS.)

(FROM OUR PARIS CORRESPONDENT.)

In the number of the JOURNAL for Nov. 3 last (vol. xxiv., p. 600), we had occasion to refer to some trials that had been made at Noisy-le-Sec, near Paris, and also in Italy, of M. Martin's process for the production of illuminating gas, a description of which appeared in the JOURNAL for Feb. 16 last (vol. xxv., p. 228). The process has been worked by the "Compagnie Universelle d'Eclairage et de Chauffage," who instituted some extensive experiments upon this new method of gas manufacture, which was to completely overthrow our industry.

The importance that has been attached to this matter induces us to give a few particulars as to the results obtained, in the hope that the ill-success attending the trials that have been made will check any fresh researches in this unproductive direction, and, above all, be the means of preventing the loss of new capital, swallowed up by companies who pretend to regenerate gas industry, but who more often only work up old ideas that have been rejected by all gas engineers, whose chief interest it is to follow up every improvement in the manufacture in which they are engaged.

The "Compagnie Universelle de l'Eclairage et de Chauffage" was started with a capital of 2,500,000 francs (£100,000), its objects being—

1. The profitable employment of the process consisting of the preparation of peat, wood, &c., and the carburation of these substances, thus rendering them fit for the manufacture of rich illuminating gas, and also for the manufacture of carbonized combustibles suitable for use in industrial operations and in domestic economy.

2. The profitable employment of the processes consisting in obtaining the complete splitting up of the mineral and vegetable hydrocarburets absorbed and divided by coke, or any other porous body, with the object of—

(*a.*) Producing rich illuminating gas and simultaneously a merchantable coke with the small coke or breeze.

(*b.*) Furnishing a coke having a very high calorific power.

The experiments made daily at Noisy-le-Sec for a period of more than six months, as well upon the manufacture of gas from peat, wood, or patent fuel, as upon the purification of these gases, have proved that these processes (the principles of which, besides, are public property) can only be applied in countries where the two following circumstances are to be met with:—

1. A very high price of coal relatively to the selling price of coke and other residual products.

2. Facilities for procuring peat, wood, hydrocarburets, and lime at a low price.

These conditions are rarely united, and, with the exception of a few towns in the interior of Russia and in Germany, the net price of coal gas, on the score of raw material, and taking into account the coke and bye-products, is not so high as to lead one to hope that an important economy might be realized on this head by the substitution of peat for coal.

A few figures which we shall supply, upon the trials made in Normandy, will show that, even when placed in the most favourable conditions, and in close proximity to a peat bog, the peat gas cannot compete with that made from coal. In fact, in most gas-works, the value of the residual products covers, in part, the cost of the raw material; and, when the price of coal rises, the price of the residual products frequently proceeds in an upward direction. This fact destroys whatever hope may have been entertained of advantageously substituting carburized peat for coal, even if the price of the latter should attain, as in the last few years, a very high figure.

On the other hand, the residual products of peat are not so easily disposed of, nor at such high prices as one had been led to expect would be the case. One ton of distilled peat generally yields from 260 to 280 kilogrammes (from 5 to 5½ cwt.) of carbonaceous residue, and when this has been sifted there remains on an average from 150 to 160 kilogrammes (from 3 to 3⅛ cwt.) of small-sized pieces of more or less friable coke; the surplus is composed of ash and cinders, the use and value of which are hypothetical, even in Paris.

Supposing the use of peat for the production of illuminating gas should be introduced in the provinces, the carbonaceous residual products of this distilled peat would have to compete with the use of coke obtained from peat carbonized in specially constructed ovens, and by a mode of carbonization which had destroyed all its nauseous gases, which does not take place in the retorts, for the residual from the distillation of peat, when burning in the open air, produces sulphurous gases that make its use very disagreeable when employed under the same conditions as charcoal. It would be impossible to avoid this inconvenience, except by increasing the duration of the distillation of the peat; but this would be detrimental to the illuminating power of the gas produced, and would further augment the expenses of heating and purification, which are already very considerable; a fresh quantity of carbonic oxide would be added in the gas, which already contains more than four times as much as coal gas. It is unnecessary to insist upon the dangers attending the use of such a mixture, which, moreover, has the effect of diminishing the illuminating power of the gas.

The difficulties attending the employment of the residue of distilled peat in industrial operations are equally great with those attending its domestic use, while its calorific value, compared with that of coke and coal, does not allow of its substitution for those two combustibles at equal or higher prices. Peat contains from 15 to 20 per cent. of ash before distillation; the residue contains not less than from 50 to 60 per cent., the inertness of which will not be compensated for by 3 or 4 per cent. of carbon left in the coke by the hydrocarburets absorbed by the peat.

Those who employ gas coke for domestic or industrial purposes do not hesitate to abandon it, and return to the use of wood or coal, when the yield of ash from the coke is increased by the employment of a coal of inferior quality for the production of the gas; the works then become encumbered with coke, the accumulations of which, rising to considerable heights, are exposed to all the inclemency of the weather.

Similar results will be produced with the residual of peat; but they will be much more disastrous, as this residual requires to be sheltered from the damp in order to preserve its combustible quality; it cannot be stacked to a height of more than six or seven feet, as it easily crumbles into dust; lastly, as this material contains sulphides, its spontaneous combustion is always to be feared. As far as the gas is concerned, its comparison with coal gas, under ordinary conditions, cannot be advantageous, as we shall show by a few figures, giving net prices, at the end of this article.

Most of the contracts entered into between municipal authorities and gas companies specify the illuminating power of the gas, and the dimensions and rate of consumption of the public lights. The gas companies, therefore, have no interest in producing gas of greater illuminating power than that stipulated for, since they are unable to reduce either the rate of consumption or the size of the flame. On the other hand, their receipts would diminish if they supplied gas of a higher illuminating power to the private consumers, as the latter, consuming the gas by meter, would thus be enabled to reduce their expenses.

As it would be impossible to utilize the carbonaceous residue from the distillation of peat for heating the retorts, gas companies would have to purchase coal or metallurgic coke for that purpose, since by the use of peat the production of retort coke is suppressed. This outlay, therefore, would occasion an increase in the expenses of distillation, so much the greater from the fact that for the production of peat gas a more vigorous, and consequently more costly, heating process is required than for the distillation of coal. Besides, the more frequent opening of the retorts for inserting the charges of peat gives rise to an important loss of caloric. Generally speaking, gas-retorts are charged four, five, or six times only in the 24 hours, from 120 to 150 kilogrammes (from 2¼ to 3 cwt.) of coal being distilled at each charge. To obtain a maximum of production in the same retorts, only 40 kilogrammes (88 lbs.) of peat can be charged each time, the distillation of which is effected in two hours, including the time occupied in charging. It would be necessary, therefore, to open the retort twelve times in the 24 hours, or two or three times more frequently than for coal. It is easy to understand that a proportionate quantity of combustible material would be required for re-establishing the normal temperature.

Moreover, in order to bring to a state of vapour the 15 or 18 per cent. of water contained in the peat, a still further expenditure of combustible material would be necessary, because if the temperature of the retort is not sufficiently high to decompose the hydrocarburets existing in the form of vapour, their transformation into permanent gas will not take place, and they will condense on leaving the retort.

The impurities contained in the gas made from carburetted peat are similar to those found in coal gas, but exist in different proportions; they are produced by the decomposition of the peat, with hygrometric water and the hydrocarburets added. Carbonic acid predominates in peat gas, as in that made from wood; sulphuretted hydrogen comes next; carbonic oxide forms from 20 to 25 per cent. of the mixture. The absorption of the carbonic acid by means of hydrated lime necessitates an average expenditure of one kilogramme of quick lime for every cubic mètre of gas purified, in which there still remains from 1½ to 2 per cent. of carbonic and sulphurous acid gas absorbable by potash on leaving the purifiers.

With regard to purification, the comparison of peat gas with coal gas is again to the advantage of the latter, as the employment of oxide of iron for the absorption of the sulphuretted hydrogen does not cost more than 40 centimes per ton of coal carbonized; and even the use of lime does not necessitate an expenditure of more than from 90 to 100 grammes per cubic mètre of gas produced. The excessive expense occasioned by the purification of the gases made from peat and wood was one of the causes which led to the abandonment of the use of these substances in gas-works where they had been adopted when coal was not to be procured.

As far as concerns the manual labour required in distillation, the comparison of peat and coal gases is again favourable to the latter. In a gas-work where a setting of seven retorts, on the plan adopted by the Paris Gas Company, is employed, two stokers are required—one for the day and the other for the night service—with the addition of a labourer in the daytime. The duration of each charge being from five to six hours, the stoker would be able to change the purifying material and attend to the furnace of his oven. This oven distils a maximum of 4200 kilogrammes (82½ cwt.) of coal in the 24 hours, producing 280 cubic mètres (9900 cubic feet) of gas per ton, or 1176 cubic mètres in all, which would require for purification, if lime were employed, 117·6 kilogrammes (2¼ cwt.) of quick lime.

The distillation of peat in a similar oven would require two day and two night men, as the extremely rapid ignition of the hydrocarburets, during the process of charging, renders it impossible for one man to charge and seal the retort with sufficient quickness to

prevent fire or serious accidents; besides this, the number of charges being three times greater than for the distillation of coal, one man would not suffice to attend to the retort-furnaces and also to the purifiers.

Finally, the oven distilling 3360 kilogrammes (66 cwt.) of peat in 24 hours would produce, at the rate of 350 cubic mètres (12,300 cubic feet) per ton, 1176 cubic mètres in all, which would require for purification 1176 kilogrammes of quick lime; and to this must likewise be added the supplementary cost of labour for the preparation of the lime.

It must be remarked here that coal gas ordinarily contains only from 2 to 3 per cent. of carbonic acid; peat gas, on the contrary, contains 22 per cent. The quantity of coal gas is, therefore, reduced by purification only from 2 to 3 per cent., while peat gas is reduced from 20 to 22 per cent.

It might be thought sufficient to augment the degree of carburation of the peat in order to compensate for the diminution in illuminating power occasioned by the mixture of carbonic acid in the gas. But it has been noticed that when the peat has absorbed 25 per cent. of the hydrocarburets, the excess does not decompose to form permanent gases; on the contrary, the simple vaporization of the hydrocarburets in excess lowers the temperature of the retort, and at the same time diminishes the quantity and deteriorates the quality of the gas produced. No advantage, therefore, would be gained by augmenting the saturation of the peat with the view of reducing the expense of the lime for purification, thus leaving in the gas a larger quantity of carbonic acid; while the extra expense incurred for this saturation would be pure loss.

It has been remarked that carburetted peat cannot be allowed to remain long in store without suffering considerable loss of gas on distillation; in fact, in the case of peat that has been stacked, a difference of 45 per cent. has been observed at the end of two months, and after a carburation of 20 per cent.; it had, therefore, lost one-fifth of the weight of the hydrocarburets it had previously absorbed. This cause of loss ought to be taken into consideration, especially when arrangements are being made in advance for an important supply of material.

(To be continued.)

SOCIÉTÉ TECHNIQUE DE L'INDUSTRIE DU GAZ EN FRANCE.

The second annual meeting of the above society was held in the assembly-room of the Society of Civil Engineers, Paris, on the 24th of May last. The meeting was numerously attended, a number of provincial members being present.

M. Ellissen, the secretary, read the minutes of the preceding meeting; and M. Foucart, the treasurer, stated the financial position of the society.

Two important resolutions were adopted by the meeting—viz., that Lyons should be the place of meeting next year, and that a prize of 500 francs should be awarded to the author of the best paper on the progress made in gas industry during the past ten years.

At the ordinary sitting, which took place at two o'clock, the following interesting communications were read:—

"Considerations on the Theory of Purification by Oxide of Iron," by M. Mallet, president.

"On Coals," by M. Foucart.

"On Meters with Constant Water Level," by M. Rouget.

"On Müller and Eichelbrenner's Ovens," by M. Mulot.

"On the Treatment of Ammoniacal Waters in Gas-Works," by M. Chevalet.

The reading of the foregoing papers gave rise to some instructive technical discussion.

The members of the committee who retired from office at this meeting were MM. Jordan, Coze, De Craponne, and Hugon, and these gentlemen being, by the rules of the society, ineligible for re-election, MM. Brémond, Leclerc, Vacher, and Villet were chosen to fill their places.

The official portion of the committee for the ensuing year is thus constituted:—M. Emile Vautier, president; M. Eugène Lebon, vice-president; MM. Albert Ellissen and L. Brémond, secretaries; and M. Foucart, treasurer. The offices of the society are at 21, Rue Abbatucci, Paris.

OUR WATER SUPPLY.—Mr. Bailey Denton writes to *The Times*:—"During the last month there has fallen on the surface of the country, with but few places excepted, within the short period of one hour, as much rain as would, if conserved, supply the entire population with water for domestic and other purposes for a whole year; there has fallen within the present year (1875) sufficient rain 'per square yard of surface' to furnish 50 per cent. more water than would satisfy each unit of the population with all required for drinking purposes. Ought an inquiry into the capability of utilizing such excesses, and so equalizing extremes, to be delayed, when it is well known that, even at this moment, while in the midst of the deluges of rain that have occurred, there are places where an insufficient provision of water exists?" The *Lancet* has the following remarks upon the same subject:—"The copious supply of rain with which we have been favoured during the past fortnight should naturally lead to the calculation as to what proportion of it will be saved and what wasted. Mr. Bailey Denton is continually drawing public attention to the enormous waste of rain water in England in consequence of the absence of any provisions for storeage, and this, too, when a good and continuous water supply is one of the much debated problems of the day. It is rather less than a year ago since we drew special attention to this subject (*à propos* of a circular issued by the Local Government Board), and advised rural sanitary authorities to adopt the plan carried out from time immemorial in many other countries, particularly in the East, and build tanks in every chief town and village. Had such tanks existed, a supply might during the past week have been obtained and stored sufficient for the wants of the population during the next eight or ten months."

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JULY 19, 1875.

The following bills received the Royal Assent by commission:—Weardale and Shildon Water; Broadstairs Water (No. 1); Alford Gas; Kilmarnock Water; Blackburn Water; Longwood Gas; Newport (Monmouthshire) Gas; Tunbridge Wells Gas; Worthing Gas; Slough Water; Manchester Corporation Water and Improvement.

The Birmingham Corporation Water Bill was read the third time, with the amendments; further amendments made, and bill passed.

The Commercial Gas Company Bill was referred to a select committee, consisting of Lord Strafford (chairman), Earl Camperdown, Viscount Falmouth, Viscount Hutchinson, and Lord Hatherton; to meet on Wednesday, July 21. A petition against alteration in the bill was presented from the Ratcliff Gaslight and Coke Company.

TUESDAY, JULY 20.

The CHAIRMAN of COMMITTEES informed the House that the promoters do not intend to proceed further with the Birmingham and Staffordshire Gas, and Birmingham Gas (No. 2) Bills during the present session.

A petition against alteration in the Commercial Gas Company Bill was presented from the Metropolitan Board of Works.

On the motion of Lord ROSEBERY, the following return was ordered to be laid before the House:—Return from every urban sanitary district in England and Wales, having more than 5000 inhabitants, giving—1. The name of place and number of inhabitants. 2. Method or methods by which the sewage and excreta are disposed of. 3. Method or methods by which the sewage is treated before reaching a stream, or is otherwise disposed of. 4. The name of the river or stream into which the sewage and manufacturing refuse (where any) is drained. 5. Description of the manufactures producing such refuse. 6. The length of time during which any systems of artificial sewage treatment have been in operation; stating also if they are at present in operation, and, if not, when and why they have been abandoned. 7. The total amount which has been expended in any works for the artificial treatment of sewage, distinguishing what portion has fallen on the rates. 8. The cost of carrying on such sewage works during the last year, for which the accounts of the authority have been made up and audited. 9. The profit, if any, derived from these works during the same period. The return to be classified in counties; the name of each place to be in alphabetical order.

METROPOLITAN WATER-RATES.

The Earl of CAMPERDOWN asked the President of the Council whether it was intended, on each successive revaluation of the metropolis for parochial purposes, to confer upon the Metropolitan Water Companies additional rating powers, without reference to the water supply; and, if not, how it was proposed to prevent such powers accruing to the water companies under the revaluation which would come into force in April, 1876. He explained that under the provisions of the Metropolis Valuation Act of 1869 it was arranged that for parochial purposes and also for Imperial taxation the metropolis should be revalued once in every five years. Under that Act the first valuation came into force in April, 1871, and the next would do so in April, 1876. The question of water supply by private companies was one entirely distinct from that of local and Imperial taxation, as contemplated by the Act of 1869. The companies, however, based their system of rating on "the annual value" of the houses, and those words they sought to construe—whether legally or not he did not know—as "the gross annual value." The practical effect was that the householders of London were rated for their water on a different basis from that on which they were taxed for other purposes; and in April, 1876, unless something were done in the meanwhile, the inhabitants within the metropolitan area would be exposed to further increased rates for exactly the same water supply as they had at present.

The Duke of RICHMOND said that the rating powers which the Metropolitan Water Companies possessed were conferred by their local Acts, and generally speaking they were limited to a rate not exceeding 10 per cent. on the annual value of the property supplied by them with water. The question as to what constituted annual value was one for determination by the justices. The Acts did not define whether it was "gross rental" or "rateable value." In a very recent case before the Common Pleas the New River Company claimed to base their rate upon the annual value as determined by the valuation lists, but the court declined to express any opinion upon that point, and decided against the company on another ground. It was not intended by the Government to confer any additional powers of rating on the Metropolitan Water Companies; and even supposing that the water-rates could be held to be regulated by the valuation lists, it was impossible to say, before those lists were finally approved and came into force, whether the value of the house property in the metropolis would be generally raised or not so as to affect the water-rates.

Lord ABERDARE remarked that people who lived in the West-end, and whose houses were valued higher on every periodical valuation, found that their water-rates were proportionately increased, although the supply of water remained the same.

Earl GREY thought that unless something was done, a great injustice would be suffered by the occupiers of houses at the hands of the water companies. It would be an immense service to the public if the water supply was taken out of the hands of private companies and entrusted to some public authority.

The Marquis of SALISBURY pointed out that rents and rates increased as other things increased, and that in all probability the outlay of the companies being greater, the additional income they received was not an unmixed advantage to them. At the same time, it might, no doubt, be necessary for Parliament to interfere if it appeared that the rates were raised in a manner which had not been contemplated. As to taking the supply of water and gas out of the hands of companies, such a policy at the present day would be Utopian; but it was to be regretted that our forefathers had not shown more wisdom in the matter.

The Earl of KIMBERLEY observed that the object of the Metropolis Valuation Act had been to make the valuations fairer, and not increase these rates.

The subject then dropped.

THURSDAY, JULY 22.

COMMERCIAL GAS COMPANY BILL.—A report was read from the select committee, that, "having found that certain of the petitioners had no *locus standi* before them, and the remaining petitioners having withdrawn, the committee had not proceeded with the consideration of the bill." The orders previously made were discharged, and the bill committed for Friday, July 23.

FRIDAY, JULY 23.

The Commons amendments to the South Staffordshire Water Bill were considered, and agreed to.

HOUSE OF COMMONS.

MONDAY, JULY 19, 1875.

The South Staffordshire Water Bill (Lords), as amended, was considered; to be read the third time.

METROPOLIS GAS COMPANIES BILL.—Petitions against this bill were presented from Portsea Island Gas Company; St. Helen's Gas Company; Surrey Consumers Gas Company; Chelmsford; Eltham; Halesowen; and Edward Birkbeck.

GAS AND WATER ORDERS CONFIRMATION BILL (LORDS).—This bill, as amended, was considered; to be read the third time.

METROPOLIS WATER SUPPLY AND FIRE PREVENTION BILL.—The second reading of this bill was deferred from Friday, July 23, to Wednesday, Aug. 4.

TUESDAY, JULY 20.

The Lords amendments to the Birmingham (Corporation) Gas, and Oldham Corporation Water Bills were agreed to.

METROPOLIS GAS COMPANIES BILL.—A petition against this bill was presented from the Salisbury Gas Company.

GAS AND WATER ORDERS CONFIRMATION BILL (LORDS).—The bill was read the third time, with the amendments, and passed.

CONSPIRACY AND PROTECTION OF PROPERTY BILL.

On the consideration of this bill, as amended,

Mr. W. HOLMS moved, in clause 4, page 2, line 10, after "service," to insert "or other contract," his object being to make the provisions with respect to breach of contract applicable not only to workmen but to other persons who might have made a contract for the supply of gas or water to a town. A great change of feeling had come over the House on this matter. He congratulated the Home Secretary on the course which he had adopted in repealing the Criminal Law Amendment Act, and in virtually accepting the amendment of the right honourable gentleman the member for the University of London. He would ask the right honourable gentleman, in the spirit of the course he had pursued, to adopt this amendment, and thus to do away with that character of class legislation which the bill at present appeared to possess. This clause should comprehend all contracts for materials and maintenance as well as for service.

Mr. CROSS thought the matter had been sufficiently discussed the other evening. This clause did not simply affect the working man; it equally applied to the manager, head of the staff, and all engaged to give personal service in the undertaking.

Mr. W. E. FORSTER approved of the amendment, and would vote for it, but he hardly thought it necessary to press it.

Mr. LOWE said the matter stood thus:—When any person, employed in what the right honourable gentleman called "service," should wilfully and maliciously break his contract of service, &c., he should be liable to be punished; but, if a person made a contract other than that of service, with exactly the same person, and then did exactly the same thing—that is, maliciously broke the contract—that person was not to be punished criminally at all. The question was made entirely to depend on the contract of service. The person was to have no punishment at all unless he was under a particular kind of contract of service. The right honourable gentleman did this in a bill of which he said the leading principle was to abolish all distinctions, as regarded criminality, between contracts of service and contracts not of service. He must say he felt himself humiliated to be a member of a Parliament which would pass such a bill.

Serjeant SIMON supported the amendment.

Mr. TALBOT asked what would be the use of omitting the word "service," in order to bring in a company, against whom the clause could not be enforced by imprisonment. There was now a perfect remedy against gas companies, who were liable to heavy penalties, so that it was idle to say the workman was placed at a disadvantage.

Sir W. HARCOURT said it was a mistake to suppose that the clause applied only to companies. It contained the word "contractor," and it would allow him to break his contract with impunity, because it was not a contract of service. He might have contracted to supply a town with gas at 4s. per 1000, and he might say, "Unless you give me 5s. I will turn off the gas." This clause would not punish him, and yet it would punish a workman for a smaller act, resulting in less serious consequences. He did not know how to reconcile the clause with the professions of a desire to deal equally with all classes. To do that, all who broke contracts should be punished alike.

Mr. WHALLEY said he could well understand why the right honourable member for London University should feel "humiliated;" but there was an obvious distinction between contracts of personal service and other contracts which could be enforced by penalties or special damages.

Lord R. MONTAGU said the clause applied exclusively to persons who were employed, and it did not apply to employers, contractors, companies, or municipal authorities. It would not, for instance, reach a tradesman who contracted to supply gas-pipes or to repair them.

The House divided, and the numbers were—

For the amendment	88
Against it	100
Majority against	—12

The amendment was therefore negatived.

Various amendments were then proposed and made, and the report was agreed to.

THURSDAY, JULY 22.

The South Staffordshire Water Bill (Lords) was read the third time, and passed.

The Barrow-in-Furness Corporation Bill (Lords) was reported, with amendments.

FRIDAY, JULY 23.

METROPOLIS GAS COMPANIES BILL.—The committee on this bill was deferred till Monday, July 26.

HOUSE OF LORDS COMMITTEE.

WEDNESDAY, JUNE 23.

(*Before Earl* DEVON, *Chairman; Earl* NELSON, *Viscount* HUTCHINSON, *Lord* CARYSFORT, *and Lord* CLONCURRY.)

WORTHING GAS BILL.

Serjeant SARGOOD and Mr. O'HARA appeared for the promoters; Mr. RICHARDS, Q.C., and Mr. HOLLWAY for the Worthing District Local Board of Health and West Worthing Improvement Commissioners, who petitioned against the bill.

Serjeant SARGOOD, in opening the case for the promoters, said this was a bill lodged by the Worthing Company, the objects of which were to enlarge the district or limit of supply, to raise additional capital, to increase the maximum price which had been allowed by the previous Act some years ago, and to amend their existing Act, by repealing and amending some of its clauses by incorporating Acts relating to gas companies, which had been passed since their last Act was granted. The company was established many years ago as a joint-stock company by private individuals, and in 1868 obtained parliamentary powers, and became incorporated and known by the name of the Worthing Gas Company. The limits granted were the town of Worthing, the district of West Worthing, and the parishes of Broadwater, Heene, and West Starling. At the time it came to Parliament they had expended the sum of £16,250, and within a few years Parliament practically doubled the capital; the old capital was £12,250 share, and £4000 loan; and the new capital granted in 1868 was £12,750 share, and £4000 loan again; the total amount coming out at £33,000. The maximum price per 1000 feet was fixed in 1868 at 5s., subject to a reduction, however, of 3d. in the event of a certain coal duty being taken off, or in the event of their removing their works outside of the boundary, whereby they might have escaped the duty; but neither of those two events had happened, and therefore the price remained subject to that particular limitation. With regard to the limits that were proposed under the present bill, they were simply enlarged so as to include the parish of Sompting, which was a neighbouring parish which required the assistance of a gas company, and it was thought right, as the gas company were coming to Parliament for other purposes, that they should lay themselves under obligation to supply gas there, and some evidence would be given on the subject. With regard to the capital, the whole of the old capital and the additional capital granted in 1868, together with the loan capital, had been called up and expended within a fraction of £112. They asked under this bill to do again what was done in 1868—to double the capital; in other words, they asked for £25,000 share capital or stock, and borrowing powers to the extent of £6250. He thought that was too reasonable a sum, having regard to the fact now ordinarily ascertained from experience, that a gas company doubled its supply in the course of a given number of years, and required to have a capital necessary for that purpose. That, however, was a matter of detail which would be given in the evidence of the engineer. With regard to the dividend, which under the old Act might go up to 10 per cent., although unhappily it had never done so, it was proposed to put a limit on the dividend of the new capital of 7 per cent. or, if issued as preference shares, 6 per cent. New capital was absolutely necessary, and without it they would be utterly unable to meet the demand made upon them. The company were under parliamentary obligations to supply gas when called upon, so that when he mentioned that, in the last four years, the increase had been 42 per cent., and having regard to the new district proposed to be supplied, it would be seen that they were not anticipating for a great number of years in asking the capital to be doubled. Some 10½ per cent., under any circumstances, would be the annual increase in the supply of gas, and that would involve within ten years a doubling of the amount of gas required, and so of capital. They asked for their maximum to be raised from 5s. to 7s., and that really was the most important part of the bill, whether to the company on the one hand, or the consumers on the other; but there were special local reasons why this indulgence should be granted. When he called it indulgence, he might use a stronger word—it was only justice that they should have a price given to them, which would be adequate and remunerative for the important service they performed. Then there were the duties imposed upon coals coming into the town, which was one of the things they desired to escape. It had been a great burden on them for a number of years, and they thought if ever the time came for them to escape, they ought to have some little chance of getting the benefit, and not have to give it to somebody else. If it had been found the company had been making maximum dividends for the previous ten or twelve years, then the local board might fairly say, "Oh, no; if there is an advantage to arise from relieving you of the impost, we think the public should have it." It would, however, be shown that the company had been sufferers in the past from the 5s. price, which was given with that condition as to the impost, and he hoped to convince the committee that they ought to get the advantage of the alteration if and when it should take place. He did not know there was much reason to expect it, but at any rate asked the committee not to re-enact it. At Heene, which was one of the places served, the company were placed under a peculiar disability. He could not tell in money's number what it represented, but at Heene they had to pay to a land company in that neighbourhood, under some arrangement or other, 15 per cent. upon the value of all the gas supplied in the district of Heene. It was some disability they were put under originally, but then it was one of the special things the Worthing Gas Company were liable to, and in consequence of which it may fairly consider itself well entitled to some indulgence. Again, the whole neighbourhood was a neighbourhood in which the houses were very sparsely scattered, and there was by no means a universal use of gas. The trade in gas in Worthing and neighbourhood was, therefore, not such a lucrative trade as in many places which were more densely populated. Another strong point was the very great change in the price of coal between the present period and the year 1868, when the limit of 5s. was put as a maximum. At that time they were getting coals at 20s. 9d. a ton, and as the price of coals was generally taken at something like a ruling figure in fixing the price of gas, when he mentioned that up to the end of last year, instead of 20s. 9d. they were paying 33s. 7d. a ton, he thought that very great change in the article they consumed or used was a very good excuse for asking for a rise in price. Now the general result of the company's trading had not been successful. They had no reserve-fund, for that was only created out of surplus profits after paying the full amount of the statutory dividends, which had been quite in the vista of the future for many years past. He was almost afraid, if the committee gave the indulgence of everything they asked in the bill, it would not bring it very much nearer, but still from 1869 to 1873 they never earned more than 6 per cent. For the half year ending Christmas, 1873, they only earned 5 per cent., and for the half year ending Midsummer, 1874, they divided literally nothing.

The CHAIRMAN: What do you make of it if you divide nothing?

Serjeant SARGOOD: *Ex nihilo nihil fit.* They earned nothing and could divide nothing. For the half year ending Christmas, 1874, the dividend was 2 per cent. The company was not a large one, the amount of capital was not great, and it might easily be imagined it was not a neighbourhood where gas manufacture could be carried on, until the demand grew largely beyond what it was at present, with any chance of being a remunerative concern. But it could not be thought such when it was found that 5 per cent. for the latter half of a year ago, and 2 per cent. for the whole of last year was all they earned. They came before the committee in the endeavour to discharge their duty to the public. They must go on because the public went on increasing their consumption of gas, the neighbourhood went on increasing, and, though the company did not make much out of it, they were bound to supply gas, and they could not make gas without money. They came to ask for help and a little encouragement; at any rate, that some of the restrictions upon them might be removed in fairness, and that they might have the additional capital as well as the additional price. Bournemouth in 1873, he thought, got 6s. 6d., and it paid no duty for coal, so that there was a precedent in their near neighbourhood, and he thought there were very many other companies who could be deposed to in the evidence. He would just tell the committee the companies who had, simply on account of the rise in the price of coal, within the last year or a year and a half, been indulged with a rise in price. Aberdare, whose maximum was 4s. in 1869, were allowed to go to 5s. in 1874; Dublin, who in 1866 stood at 4s. in 1874, went to 5s. 4d.; Neath in 1866, at 4s. 2d., went in 1874 to 5s. 6d.; Brighton, who in 1866 were 3s. 6d., went up to 4s. in 1874. He recollected being in that discussion on behalf of the corporation as against the company, who would have had another 1s.; but they gave them the indulgence of a new burner, whereby the illuminating power was very much affected in their favour, and they put on 6d. in price with the burner, instead of the 1s. without the change. He remembered, in 1871, Burnley was at 3s., now it was allowed 3s. 8d.; in 1869 Glasgow was 4s. 7d., and it was put up last year to 6s. In 1868 Cork stood at 4s. 9d., and it was put up to 5s. 3d.; the price at Paisley in 1870 was 4s. 2d., and 6s. in 1874; in 1870 Wrexham, that stood at 4s., was put up to 4s. 8d.; Carmarthen, that in the same year charged 4s. 6d., was this year allowed 6s. He did not mean

to say that those gave a rateable proportion by which all companies were to be governed—each stood on its own special circumstances; but he did mean, and he proposed to the committee, that the changes in the coal market during the last few years had been recognized by Parliament continuously in the course of last session, and again in this, as a reason for gas companies being allowed a higher maximum price than that which under previous Acts of Parliament they obtained. He ought not to forget to mention that which was very strongly on his mind—the Metropolis Gas Bill—and he did not doubt the committee knew that in the metropolis the principle of raising the price of gas, when the material out of which it was made had increased in value, had been long since recognized, and that a provision of Mr. Cardwell's Act of 1868, introduced a distinct machinery for altering the price at the instance of the company or of the consumers, as the exigencies of the case might seem to dictate to be reasonable. The other parts of the bill before the committee were not, perhaps, very important. It was proposed to alter the general meetings, the directors qualifications, and the quorum of directors. He need not trouble the committee with the details, because he did not think any one cared about it; they proposed to repeal the 62nd clause, that was about the duty on coal; they also proposed to repeal clauses 63, 64, 65, and 66, as to illuminating power, and so forth. As there were no petitioners against those clauses, he need not enter into details. The only petition was one lodged by two local boards—the Local Board of Health for the district of Worthing, and the West Worthing Improvement Commissioners. After setting out, as usual, the nature of the bill, it said, "That our powers extend over certain districts; that they are the Local Board of Health, with certain duties imposed upon them," &c. They alluded to what the preamble of the bill stated, and then they began to discuss merits, and there he would begin to read. They said: "Your petitioners deny the truth of any such allegation, or the expediency of any such provisions; they aver, on the contrary, that at the time at which the company was incorporated, the capital sum of £12,250 capital stock was issued to the shareholders of the company, in respect of their having been shareholders in an unincorporated company of the same name, which was dissolved by the Worthing Gas Act, 1868." That was a mere historical fact, which was all recited in the Act of 1868. He supposed they did not ask the committee to sit in judgment upon what Parliament did in 1868. At any rate, if they did they would soon be put right. Then in paragraph 8 they said, "That the land, works, erections," and so forth, "and other property whatsoever at the time of the dissolution and incorporation belonging to the dissolved company and vested in the company (after deducting a mortgage debt)," and then they said that they were not of the value of that amount of money. "But that the sum of £12,250 so as aforesaid paid by the company for the same was an excessive, an unreasonable price, and that the company have otherwise improvidently expended their capital." Now the first allegation was a criticism upon the past, which, having been submitted to Parliament in 1868, he need not trouble the committee upon. The other allegation stated that the company had improvidently expended their capital. Upon that he would say there was not the slightest pretence for such a statement, but if they chose to raise the issue it was their business to prove it. He would produce evidence of what they had done, and he supposed the petitioners would trust to adroit cross-examination to try and make out their case, but he was sure, from the facts as submitted to him, that no engineer would venture to come and say that the company had been improvidently doing anything of the sort. They had been bound to spend their capital in the interest, and to meet the wants of the public, and having spent it they ought to have power to supplement it to meet the increased demand for gas. Then the 9th paragraph was, "Your petitioners say moreover that the object of the company is, and the effect of the Act would be, to secure to the shareholders therein, not only on the additional capital they desire to raise, but likewise on the capital so improvidently expended as aforesaid, the large dividends they hope to receive by means of the increased price." The allegation in that clause was most rational—the company did hope by means of an increased price to get a larger dividend, and when he told the committee that they had never exceeded 6 per cent., and had dwindled down to 2 per cent., he hoped they would think the time was coming when they might reasonably be helped to get a larger dividend. That he avowed was their object, and it seemed to him to be a very legitimate one. In the next paragraph they said, "Your petitioners say moreover that the price of 5*s.* per 1000 cubic feet now charged is fully as high as is found in other places." If that was so, the evidence as to the result at Worthing showed that it was not so high as was found necessary in that district; when they only got 2 per cent., it was quite clear the price was inadequate for a fair return on the capital invested. Again, "Your petitioners submit that if the company deem it desirable to expend further money in the extension or improvement of their system, the cost thereof should be defrayed out of their revenue." He thought he could safely appeal to the committee to say that it was not a proper commercial idea that capital should be made out of revenue (by depriving the shareholders of their fair interest) and invested upon works. The result would be that if any price could be charged which would be adequate for doing it, the consumers would be finding the capital in that price instead of the shareholders by supplementing it with additional capital. The proposition was so utterly unsound that it was not worth five minutes comment, and only showed that when a local board came there they must say something as an excuse for their appearing in what was called the interest of the consumers. At clause 12 they said, "Your petitioners submit likewise that if the company deem it desirable to extend their mains to Sompting or other villages at a considerable distance from the company's works, your petitioners and the inhabitants and consumers of gas in their respective districts ought not to be charged, as proposed by the bill, a higher price for the gas consumed by them in order to pay a large dividend on capital laid out in supplying such villages." He agreed to that as an abstract proposition; they did not ask to have the price raised in order to pay a large dividend upon the capital lodged in Sompting, but on totally different grounds. It was part of the general business to extend the mains to Sompting, but they did not ask for an increased price to cover it, but because it was utterly inadequate as a return for the capital which was even at present invested. And then they said, "That your petitioners jointly, and each of them separately, as regards their respective districts, would be prepared" (it was a singular phrase) "to purchase the works and plant and property of the company at a fair valuation, and to supply the inhabitants of the respective districts," and so forth. Seeing how the company stood with regard to capital, how little they got in return for it, he should have thought, if there was any sincerity in the idea that the local boards were willing to buy up the works and supply their own gas, the present was the best time to make the proposition; but when he told the committee that nothing of the kind had ever been suggested, as far as he knew, and that neither of them had the means of doing so, it would be known what the meaning of that allegation was. If they were sincere, and could show the committee that they were ready to give a fair price for these works, that they had any complaint against the company of not having done their work properly, and that they had offered to buy the company up at a fair price, and do it themselves, that would be some excuse for this allegation; but it was entirely a new suggestion. They had never made overtures of any description to the company, nor did he believe they were in the least prepared to make the effort, even supposing they had the opportunity. They objected to the repeal of section 62, which was with regard to the reduction of price, in the event of the dues being taken off. He need not enlarge upon that, having once explained it. And then they said, "That without some special, or further, or other provision than now exists, be inserted in the said bill for the checking of useless, unnecessary, or improvident expenditure by the company, or for the better or more efficient examination and auditing of their accounts, the limitation of the dividend to be paid out of profits provided or intended by the 9th section of the said bill will be found illusive, and of no practical value." He did not know what all that meant. If they wanted an auditor on behalf of the consumers to examine the company's half-yearly accounts, all he could say was they were welcome to it. The company had not the slightest objection, if the committee thought fit for them to have one; but to put it in that grandiose form, as though they were in imminent peril of not being fairly dealt with without such a public officer, was hardly right. There had never been any imputation whatever upon the company's conduct or the fairness of the accounts. Then in section 17 they said, "That unless express provision be inserted in the said bill to the contrary, the said increased rate of 7*s.* for gas supplied by the company will be available to enable them in every year hereafter to make out of their profits not only a dividend on the additional capital referred to in the 26th section of the Worthing Gas Act, 1868, and also on the additional capital referred to in the 9th section of the said bill, but also a larger dividend, which may be at any time necessary to make up the deficiency in any previous dividend which shall have fallen short of the said yearly rate." He supposed that sentence meant that, if by their future industry they could earn enough profit, not only to pay the aggregate dividend upon the capital which existed, but to make a surplus, that they would have what Parliament always intended they should have—namely, a reserve-fund; and having a reserve-fund, they would be able to make up for some of their past disastrous working, and the possible losses which they had sustained in having one half year no dividend at all, and in another but 2 per cent. That was perfectly true, and all he could say was, that it was thoroughly consonant with gas legislation; it was not a grievance, as though they were introducing a new doctrine; it was only saying to the committee, in other words, "Parliament has sanctioned the full dividend if the company can earn it, and has sanctioned their laying by a reserve-fund for certain purposes, if they can get it. Hitherto they have not been able to get it, but have been wretchedly unfortunate in not earning their dividend. In future, if they get it, they will ask to do that which Parliament as a principle had already sanctioned;" therefore it was put in that involved way, as though it was a novelty of their invention, and a great grievance to them. It was only asking that they might have a chance in the future of availing themselves of a principle from which at present they had not gained the slightest advantage on account of the smallness of the scale on which they were carrying on their works, and the little remuneration they had earned with the price which they had been contented to take. There were other allegations in the petitions, but they were only formal, and he believed that he had put the committee in possession of the skeleton of the case and of the opposition, and he would now proceed to call evidence.

Mr. *Charles Newton*, examined by Serjeant Sargood.

I have been chairman of the Worthing Gas Company since 1871, and am pretty well aware of the internal working of the company. The whole share and loan capital, £33,000, has been raised and expended, I fully believe in every respect with every regard to the interests of the public and of the shareholders, and with due economy and care. The amount of plant taken over from the old company at the date of incorporation was £18,217 4*s.* 4*d.*; meters, £620; land, £1033; making a total of £19,870 4*s.* 4*d.* Subsequently, out of the new capital granted by Parliament, we have spent on the new retort-house, coal stores, purifiers, &c., £10,006 4*s.* 11*d.*, on new works £2511 4*s.* 3*d.*, on new meters £499 10*s.* 1*d.*, the grand total being £32,887 3*s.* 7*d.*, which, within £112 odd, accounts for the £33,000 of capital. When the present maximum price of 5*s.* was established by the Act of 1868, the cost of coals into the works was 20*s.* 9*d.* per ton. At the end of last year they had risen to 33*s.* 3*d.*, and they were much higher in 1873. It was entirely due to the disastrous epoch of high-priced coals that our dividends came down to nothing in the first half, and 2 per cent. in the second half of 1874. Even now, with the present price of coals, we could not carry on our concern with the chance of profit if limited to 5*s.* Labour has likewise risen very materially, as has also the price of iron and lime. I am afraid there does not seem to be the least probability of any one of them being reduced. Since our incorporation down to Midsummer, 1873, our rate of dividend was never more than 6 per cent. Whereas we were entitled to 10 per cent. on the old, and 7 per cent. on the new capital, if we could have earned it. For the latter half of 1873 we only divided 5 per cent., and for 1874, 2 per cent. Unfortunately we have not been able to lay by a shilling, and therefore any chance we might have had of paying back dividends out of a reserve-fund has never been entertained. With reference to the demand for gas, it has been from year to year at 10½ per cent., increase, and this will probably be much greater as we go on. For the year 1870 the total consumption was 15,131,950 feet. In 1874 it had risen to 21,574,472 feet, which is 42½ per cent. increase in the four years. It is a matter of impossibility that we could go on extending our works commensurately with the demand unless we have further capital, and I do not think it would be possible to raise any with the prospects under which we have hitherto been labouring.

Cross-examined by Mr. Hollway: Of the amount of capital we propose by this bill to raise, I think we shall want at once about £5000. I do not think any of it will be required for laying mains to Sompting because there is no probability of our supplying that place until it develops much more than it has done. The people of Sompting have asked us to send gas there, but as it would not have been profitable we have not undertaken it.

Mr. Hollway: I understood that Serjeant Sargood put forward as one of the reasons for the amount of capital asked for, the expense of supplying Sompting.

Serjeant Sargood: We cannot afford to give it to them just yet; still we take power for it, subject to the committee's approval.

Cross-examination resumed: I know Lancing, the next parish to Sompting, and they have gas from the same works which supply a part of Brighton. I have heard that they pay 5*s.* per 1000 cubic feet of gas, and are three or four miles distant from the works. We want the £5000 for enlarging the retort-house, fitting up additional retorts, and erecting a scrubber, which will enable us to supply any increase that may be required. We are not calculating on a very much larger increase of demand in the future than there has been of late years, as Worthing is hardly a place where a very much larger demand can be expected. I have not ascertained what the neighbouring towns are paying for their gas, for the reason that I did not think they afforded any comparison, their circumstances being different. For instance, Chichester which has a 5*s.* maximum, would be a more desirable place to supply with gas than Worthing, because we have to pay dues to the local board of 2*s.* 6*d.* a ton of coals. Then also with regard to the houses, many of them are separated at great distances from each other, and in many streets being let out in apartments there are perhaps very few that at present take gas, so that we have say 250 yards of main laid to supply one or two houses. Since this bill has been introduced I have been thoroughly conversant with the whole proceedings as to the opposition of the Local Boards of both Worthing and West Worthing. Some correspondence took place between us, and the Local Board of Worthing. And there was some indirect allusion to our willingness or not to sell the works.

Mr. Hollway: Was the indirect allusion a letter from the local board, dated March 3, 1875, addressed to the secretary of the gas company, and as follows?—"At a meeting of the local board, held on Monday last, resolutions were passed declaring it to be expedient to oppose the bill of the gas company, and to negotiate with the company for the purchase of their works. The latter resolution you will be good enough to consider as now formally before the company. At a meeting of the General Purposes Committee of the local board, subsequently held,

I submitted the conversation with Mr. Richmond, the secretary. Upon this the committee decided that before attempting to enter upon any further compromise, the gas company be invited to furnish them with a list of towns similarly situated, and as populous as Worthing, where to the knowledge of the company the charge for gas now exceeds 5s. per 1000 cubic feet. I may add, that should it be the fact that there are a fair proportion of towns, of the character stated, where the charge is in excess of that named, it would be carefully considered, and in all probability influence the future decisions of the board." You cannot say, I think, that the board did not seem to be inclined fairly to meet you upon that ground?

Witness: I do not know that they had any intention whatever of purchasing.

Mr. HOLLWAY: At any rate, that letter put a distinct proposition before you with regard to the sale of the works. Then there is the answer, dated April 15, addressed to the clerk to the local board, which says: "I am instructed by my directors to acknowledge the receipt of your letter of the 3rd ult., and, in reply thereto, to say that they have at present no intention of disposing of the company's works." You refused to enter into negotiations.

Witness: You were not in a position to do so.

Serjeant SARGOOD: All the letter says is that they were not disposed to do so. If you had liked to have made us an offer, you were entitled to do so.

Cross-examination resumed: Coal and iron have been going down in price since 1873-4; but there is no doubt, I think, that coal will go up very considerably in a short time. Very few houses, in comparison with the number supplied by the gas company, are situated on the estate of the West Worthing Land Company. I think they have an Act to erect gas-works for themselves.

Mr. HOLLWAY: When you proposed to take in their district of supply, did they not say, "We will supply you, and make the gas-works ourselves, if we do not come to some agreement?"

Witness: Nothing of the sort was said, because the agreement you refer to was made three years previous to their Act. It is that for all gas consumed in a certain portion of West Worthing an allowance of 15 per cent. shall be paid to the Heene Estate Company. At the same time, by that contract we are bound not to charge the West Worthing consumers more than the other consumers. When we were incorporated we were obliged to take that burden, as we bought the old company with a full knowledge of their liabilities. We pay about £60 a year; but, of course, it increases with the consumption. It began with a payment of £7 a year. We charge ourselves with that amount in ascertaining the profit which is divisible as dividend. We do not first ascertain what is divisible as dividend, and then deduct it. Ours is the proper way of doing it, as it is a discount made to them just as it would be made to any individual consumer.

Re-examined by Serjeant SARGOOD: As far as Lancing is concerned, although they may get their gas for 5s., that does not show we could supply it at the same figure, as a mile of the mains of the company that supplies them would earn, I should think, ten times as much as a mile of ours, and therefore we are certainly not to be compared with a company supplying a little way off at a lower price. With regard to the contract with the Heene Estate Company, we took it over from the old company among the obligations, and it is in fact a discount given to some people who established a building society. We therefore open an account with the Heene people, give them a credit of 15 per cent. upon the returns of Heene, and then debit our account with the amount allowed.

Mr. *Horatio Brothers*, examined by Serjeant SARGOOD.

I am a member of the Institute of Civil Engineers, and engineer of the Western division of the Chartered Gas Company. I have had some 30 years experience as an engineer, have been connected with the Worthing Company since 1862, and since 1868 have been engineer to the company. All its extensions, improvements, and works have been carried out under my direction. The company had been in existence since 1833, and as an ordinary private company it was subject to the operation of the Joint-Stock Companies Act, under a deed of settlement. In 1868, by parliamentary enactment, the price of gas was fixed at 5s.; the price until July 1, 1869, being 6s. 3d. I corroborate the evidence of the previous witness as to the dividend that price produced. In fact, the price of coal gave us no profit at all, although our working was better, and had been better than it was previously, and our working expenses less than the average of the London companies. The ordinary rate of consumption, as regards its increase, is about 10 per cent. per annum, so that it would not take 10 years to double the works because there is the compound increase. At all events it would not be likely to exceed it, even if the committee should accede to the double capital at this moment. In gas undertakings it is right to anticipate in a given number of years the doubling of the capital in order to avoid having to come to Parliament again shortly. I know from large experience that the new works since 1868 have been carried out in a more economical manner than in the majority of cases. There is not the least foundation for saying either that we paid an unreasonable price for the plant of the old company, or that, having acquired it, we have since then been improvidently expending capital. In fact, purchases made by corporate bodies and local authorities have been at the rate of from 18 to 20 years purchase, while we bought ours at 11½ years purchase; and, in increasing the plant by an expenditure of a little over £10,000, we are enabled to manufacture four times as much as we could do with the old plant, which cost £4000 odd. So far as can be tested by the amount of gas got out of a given quantity of coal, the works have improved considerably; it is geater than is usually manufactured by works of that kind, and therefore may farily challenge comparison with any company upon a similar basis. In order to pay upon our present capital, with our present consumption of gas, the fully authorized parliamentary dividend, we shall want 1s. 10d. more than the cost of manufacture; that is to say, the price asked for, 7s. I think that is a fair figure, because, although we put that as a maximum, it is not our intention to charge it unless coal goes to an abnormal price, and if its price had remained as it was, we should positively have required 7s. to have paid our dividends. So that, having regard to the disasters of the past, I think it is only a reasonable limit that we ought to have in the present. Coals cost us from Shoreham Harbour, about six miles off, 6s. 7d. per ton, in addition to the first cost on board and the freight. Worthing is not a manufacturing town, and that fact affects us considerably in the disposal of coke. We have to dispose of it at Brighton as best we can, at very low prices, and as there are no manufacturers there, the market gardeners and florists are our chief consumers for it. By moving the coke about it deteriorates very rapidly, and besides we have the competition of the two companies in Brighton. Under the circumstances, which are exceptional, it has been dealt with in a provident and prudent manner, and at the best price that could be obtained. With regard to the amount of increased capital, the necessary outlay upon works which the ordinary normal increase demands was stated by the last witness at £5000. My estimate is £5570—Workshops and offices £600, setting of retorts £420, to complete scrubbers £50, to replace some very old defective mains £1000, working capital (of which we have none whatever at present) £2000, and expenses of this bill, say £1500—which I look upon as the necessary immediate outlay. Having regard to the experience of the last 18 months, I am quite certain we should have no chance at all of raising capital unless we have a price which will give a little better dividend than 2 per cent. In 1868 we had great difficulty in increasing the capital, and that, among other reasons, is the ground for asking an increase of price.

Cross-examined by Mr. RICHARDS: In 1868, out of the amount raised under the Act, £12,500 was allocated to the old plant, and given to the shareholders in the old association. Very shortly afterwards we made extensions, but carried on the works without any considerable repairs. I have returns showing the number of tons of coal carbonized. In the half year ending Dec. 31, 1871, there were 1277 tons. For the first half of 1872, 987 tons; second half, 1291 tons. Up to June, 1873, 1126 tons; and to Dec., 1339 tons. In 1874, 2491 tons. The company's district of Worthing proper and West Worthing is not yet filled up, but it is increasing. The increase we propose in the price of gas is exactly 40 per cent. I do not know any instance of such an increase as that, but I know of towns where the price is as high. The Revision Commissioners gave the Chartered Company an increase of 33 per cent. for one year; it did not continue indefinitely, though they had an opportunity of going for a revision again. I do not know what are the prices charged at the several sea-bathing places along the south coast. I have heard the price at Shoreham is 5s.; but the Brighton and Hove Company supply there, and they do not pay coal dues. I presume the price at Lancing, between Shoreham and Worthing, is the same. If we get a price of 7s., the company would not necessarily be able to pay back dividends, though there is nothing to prevent them. The Act of 1847 being incorporated, whenever the company have reached their maximum rate of dividend they are at liberty to create a reserve-fund, and from time to time make up by back dividends the difference between that which they have actually paid and that which they might have paid if they could.

Serjeant SARGOOD: We are able to do so now if we have the money, but we shall not be able to do so unless we get it.

Mr. RICHARDS: With regard to the West Worthing people, is there not some arrangement about the payment of 9d. per 1000 to some land company?

Witness: I was a party to the original document, and saw the directors of the West Worthing Investment Company. They had power under Act of Parliament to build gas-works, and we were then a joint-stock company without any parliamentary powers, and to obtain the lighting of their district we gave them that consideration. I believe it began at 10, and has since gone up to 15 per cent. The company is now in liquidation, and I understand it is kept open simply for the purpose of receiving that 15 per cent.

Mr. HOLLWAY stated the company was not in liquidation at all.

Cross-examination resumed: At all events the payment continues in the same form, and we do not see our way out of it. That, of course, like every other payment, comes out of the shareholder's pockets as long as they do not get full dividends. The investment company had parliamentary powers of starting gas-works of their own, and the gas company bought them off by agreeing to pay 10 per cent. originally, and 15 per cent afterwards.

Mr. HOLLWAY: I think they asked 20, you offered them 10 per cent., and a compromise was come to that 10 per cent. should be paid for three years, and after that 15 per cent.

Mr. RICHARDS: Did not your company agree to pay 9d. per 1000 feet, or 15 per cent.?

Serjeant SARGOOD objected to the question, on the ground that it was not fair to have any criticism raised as to whether the contract was a provident or an improvident one, as the present company were not responsible for it.

The CHAIRMAN said that the committee were of opinion that the examination might be allowed to proceed.

Mr. RICHARDS (to witness): That really was the meaning of it, that the gas company agreed to pay this 15 per cent. in order to prevent the investment company erecting works of their own?

Witness: I quite agree with that, with this addition, that, of course, supplying gas, they expected a profit in addition to the commission they gave the investment company. Part of the agreement was that, so long as the money was paid, the investment company should not start works of their own.

Cross-examination resumed: One of the propositions in the present bill is to extend our mains to Sompting, which is about three miles from our works, but only about a mile from the end of our present mains. I have not included this in my estimate.

Mr. RICHARDS: Is it not sometimes convenient, supposing you were to get into a flourishing state of circumstances, to have a little outlying place to which you can extend your mains, so as to invest capital upon which you get dividend, regardless of whether it is a lucrative investment or not?

Witness: I have had a great deal of experience in the north and other places, but I never knew it done.

Cross-examination concluded: I have no idea what is the population of Sompting, and may say we have no intention of going there at present; if we did, we should continue on the main we have running in that direction. If ever we go there it must decidedly be very much less productive than the town of Worthing. If the charging were left to me, I should fix a higher price for it as being an outlying district. I see a good reason why Worthing should have a higher price than, say, Shoreham, which is simply an off-district of Brighton. If the works had been built simply for their supply, they would not get gas at the price they do; and even supposing they had been so built, the price of coal would be 6s. 7d. cheaper than with us.

Re-examined by Serjeant SARGOOD: Although Sompting wants gas, we should not supply it until we saw our way clear to getting an adequate return for our outlay. We do not propose to come for a separate bill to supply Sompting: therefore, although it may be advantageous to do it within 10 years, we do not purpose doing it yet. We have not yet exhausted all our present powers of supply, having deferred going to West Starling because it would not be productive. We are not, while unable to get dividend for our shareholders, likely to spend capital where it is not likely to earn any profit.

Mr. *George Wilson Stevenson*, examined by Mr. O'HARA.

I am an engineer, residing at Westminster, and have had considerable experience, extending over nearly 30 years, in the construction and working of gas-works. I was consulted by the promoters of this bill, and paid a special visit to Worthing in reference to this inquiry. I have inspected the works and examined the accounts of the company. I agree with the evidence of Mr. Brothers as to there being an immediate necessity for an outlay of £5570. The increase of the company's business since 1868 has been uniformly 10½ per cent. per annum. That is a larger increase than usual, but not larger than the increase in most of the southern watering-places. The usual increase is 5 or 6 per cent. in the kingdom generally, but at Worthing the increase, like that at many other southern watering-places, has been greater. The effect of that rapid rate of increase makes it necessary that the capital should be doubled every twelve years. The company are seeking £25,000 additional capital, and it is not too much to ask. In my opinion it will be from twelve to fourteen years before that £25,000 is exhausted. The proposed rate of dividend on the new capital is 7 per cent., the average rate over the whole of the new capital about 6½ per cent., which is a very moderate rate, taking it over the whole of the capital. There is nothing difficult about borrowing money at a moderate rate. Lord Redesdale limits the amount of borrowing to one-fourth of the capital raised by shares. I think the company should have power to supply Sompting before they come to Parliament again in the next ten years. Their mains are within a mile of the place, and when they enter the village they have consumers on each side of the street. They would be able at very little expense to supply it, and would not go there until they saw it profitable to do so. It is desirable they should have power to go there, but I do not think it a very important part of the bill. I have considered the question of price which, to enable the company to carry on their works with benefit, should not be less than 6s. 6d. They require more than that in abnormal years, to enable them to earn their statutory dividends. If the price were so fixed, it would be fair as between the company and the consumers. In 1868, when the price was fixed at 5s., coal was 20s. 9d. a ton, and the company got back 8s. 9d. for residuals, whereby the net cost of the raw material was reduced to 12s. Under these circumstances, the company actually earned 8, but only divided 6 per cent. Last year, which was what we call an abnormal year, the price of coal was not quite so high as in the year previous, but it was 33s. 3d. into the works,

and the company got back for residuals 9s. 6d., leaving net cost of raw material at 23s. 9d., or double what it was in 1868 within 3d.

By the COMMITTEE: The price of coal at the present time corresponding with the 33s. of last year is 25s.

Examination continued: There is little demand for coke at Worthing; at present it is heaped up in the works, being unsaleable. The great object of gas companies is to get rid of their coke as quickly as possible, because it deteriorates by keeping, and so the net cost of the raw material is increased. I do not see how the promoters are to raise their capital without some relief from their present circumstances, as the price of raw material is such as to make it impossible for them to get any profit. Last year the cost of coal was £4141, and the company got back by the sale of residuals £1185, leaving £2956 as the cost of the raw material, which works out to 32·9d. per 1000 feet sold. The working expenses were £1558, or 17·3d. per 1000 feet sold, making net cost 50·2d. To that we have to add 4d. per 1000 feet for interest on loans, because that is a charge which has to be made before any dividend is struck. It takes precedence of dividends, so that 4s. 6d. is the net cost of gas at the consumers meters before the shareholders get any return. Ten per cent. on the original capital is £1225; 7 per cent. on the additional capital, £892 10s.; or together, 23½d. per 1000 feet sold. To that must be added 7 per cent. upon the proposed new capital, £390, or about 4½d. per 1000 feet. Totting up the cost of gas 4s. 6d., and dividend 2s. 4d., makes 6s. 10d. as the price that should be charged to enable the company to pay statutory dividends. Therefore, in suggesting that 6s. 6d. should be the maximum, I have not given them enough, in a time of scarcity of coal, to earn the full amount. I do not know the price of coal at Bournemouth, but coal costs less than at Worthing. The former company's maximum price, by their 1873 Act, is 6s. 6d. They have not tax upon their coal as the Worthing Company have, and every shilling in the cost of coal represents 1½d. per 1000 in the cost price of gas. [Witness then handed in a list of companies and corporations which had had the sanction of Parliament and the Board of Trade to raise the price of gas of late years.] The total working expenses of the Worthing Gas Company, including the cost of production and distribution, repairs, renewals, salaries, and everything except coal, is 12s. 6d. per ton of coal carbonized, and that is extremely low, showing the company are not extravagant in their working. It is a good deal less than many of the London companies with their enormous consumption, expend. In fact, considering all matters, the reason why the company have paid so small a dividend in past years is due to a cause entirely beyond their own control, and that is the abnormal cost of raw material. If they had had an opportunity, which they never have had, of creating a reserve-fund, they would not have been so badly off last year. I think the works are admirably situated, and very well designed. There is not a penny expended there uselessly. I think the relief the company ask is reasonable; they had no alternative but to come for it. The company paid in 1868, upon the then profits of the undertaking, 11½ years purchase, which is not a high figure. The usual mode of purchasing a non-statutable company, which was their position at that time, is to give 16¾ years purchase; if the company is statutable, to give 20 to 24 years purchase. If purchased in the usual way in 1868, it would have been bought for £23,343. I think it was very cheaply purchased, and the allegation in the petition is wrong altogether, as is the one that the company has been wasteful and extravagant. With reference to clause 11 of the petition, which suggests that the works should be extended out of revenue, if a bill, having that object in view, were submitted to Parliament, I do not think it would meet even with consideration, because it would be making the consumers of to-day pay for works which were to last for years to come; besides, it would be impossible for the company to do it. I see no objection to a public auditor, if it be any satisfaction to the local board. I should say, let them authorize such appointment. It has been done in a great number of provincial towns, and works very well. Serjeant Sargood, in his opening speech, made that concession. The local boards have never shown themselves willing to purchase the undertaking. The allegation on the subject in the petition is one frequently inserted. To sum up, I think the provisions of the bill are reasonable, and such as the committee should be asked to sanction, except that the price per 1000 feet might with justice, both to the company and the consumers, be put at 6s. 6d. Without the bill the company cannot keep their obligations, they cannot keep their concern going; they must raise fresh capital, and, without these powers, they cannot do it. I should be sorry to put a penny into their concern with their maximum price as it is now.

Cross-examined by Mr. RICHARDS: A good deal of the old buildings of the company have been pulled down; but these do not form the most important part of the expenditure of a gas company. The new buildings have been erected out of the 1868 capital, and I think that right under the circumstances. If the old company had been bought by arbitration, it would have cost the present company £23,000 odd. It was bought for £16,500, and the difference between these amounts may be taken as the sum required to put the works in proper going condition. If the company had paid the larger sum, they ought not to have had to expend a penny in the way of renewals. The working expenses, I said, were less than some of the London companies; but the consumption per mile of mains is 20 times as great in London as in Worthing. The cost of production, too, has an important bearing on gas-making, and when a company gets up to 50 millions a year, it can make very much more cheaply than such a one as the Worthing Company, whose total gas sold is only 21 million. The promoters asked 7s. 6d. in the House of Commons; but they never consulted me there, or I never should have advised it. I hope the committee will not be persuaded to put the price even at 6s., because I am quite sure it will not be remunerative. At 5s. 6d. it cannot be done. The calculations I made were founded on the results of 1874, which was an abnormal year, and it is better to take such a one than a more normal year, because if the cost of coal had remained at, say, what it was when they got their Act in 1868, they would not have asked for an increased price. But having had experience of a disastrous period, they come for protection against such another time. It does not follow they would charge the 6s. 6d., except in abnormal years, because when an exceptional price is put on gas the consumption goes down. I cannot tell if the late high price of coal is likely to occur again. I never expected it before. I do not know the price charged for gas at Hastings, but should say 4s. would pay better there than 6s. at Worthing. Why I selected Bournemouth for an example was that it is a place on the south coast that has lately been to Parliament, and had its price fixed at 6s. 6d. The unaccounted-for gas is not great at Worthing, and so I presume the mains are satisfactory. I do not know how much has been spent on them since 1868. The company should spend about £1000 upon the revision of the mains and extension of the district. This is not a large sum to lay out in a growing place. I based my calculations upon the year 1874, which was not so bad a year as 1873. The largest daily make at the Worthing works last winter was 120,000 feet, as ascertained by the station-meter. I do not know what quantity was sent out. The holders are capable of storing 150,000 feet. The retorts at present erected are 28 in number, in four settings, and are capable of producing 140,000 feet in the 24 hours. The retort-house being built with a view to future extensions, could receive 112 retorts. There is no further room required for holders nor for coal stores, but they require to erect a scrubber and two new purifiers. The benches are ready to receive the retorts, so there will only be the cost of them and their settings. I estimate for an addition of 100 per cent., or nine years supply. They are now working the present retorts harder than they should do. They have not a spare oven of retorts, which they should have; for if they had a break-down in any of their present settings, there would be a danger of darkness in the town.

Mr. RICHARDS: You know the 62nd clause of the Worthing Gas Act says that "from and after the 1st of July, 1869, the price to be charged by the new company for gas shall not exceed 5s. per 1000; provided that in case the coal duty now levied in the district of Worthing shall cease, the price shall be reduced by 3d. per 1000." Do you know it is proposed to repeal that by this bill?

Witness: I have not been consulted about it, but should think their objection is only in regard to the former part of the section. I do not see any objection, when they are asking for an increased price, to retaining the proviso.

Mr. O'HARA stated that the promoters were quite willing to retain the proviso.

Re-examined by Mr. O'HARA: The 6s. 6d. price does not include a reserve-fund, nor even allow the full maximum dividend; but it is best to compel companies to do the best they can, in order to earn a dividend. The price proposed in the Littlehampton Provisional Order was 8s.

By the COMMITTEE: The amount of unaccounted-for gas at Worthing is 11 per cent., which includes not only leakage, but all gas that is consumed upon the works, and all not paid for by money. The furnaces are all heated by coke, and, after using all that is required, there is still a large amount to sell.

This concluded the promoters case.

THURSDAY, JUNE 24.

Mr. *Robert Paulson Spice*, examined by Mr. RICHARDS.

I am a civil engineer, and have been in practice for about 30 years in connexion with gas companies, and have had as extensive an experience in erecting, designing, and valuing gas-works as any man in England, except one. I know the gas-works at Worthing, and have been to inspect them specially with reference to this case. I believe the works are exceedingly well designed and executed, with all the usual modern appliances. I do not consider them at all well situated; they are in such a neighbourhood as gas-works should not be placed in. They are in too good a neighbourhood, being surrounded, or nearly so, by very good residential property, and they are away from the source of supply for their raw material. All the coals have to be carted to the works from the railway, a considerable distance, at a cost of about 1s. per ton; and their residuals, such as tar and other things, have also to be carted away. In addition to that, they are circumscribed. They cannot be extended beyond their present limits, and the site will be found quite insufficient in the course of a few years. They have room sufficient to double the existing number of retorts, perhaps more than that. The time will come when these works will have to be removed, or supplemented by other works. Looking at the existing state of things, and to the possibility of extension and the power of future supply already existing in the works, I do not think there is any necessity for their raising such a capital as £25,000, which is a sum actually equal to the existing capital. The company are now using 28 retorts; they can erect 28 more in existing ovens already built, and, at an increase of 10½ per cent. per annum, those 28 retorts would last them for nine or ten years. I do not know the extent of their present mains. I would not quarrel with an outlay of £1000 for mains in a place like Worthing. It may be judiciously laid out; the larger the mains, the less the unaccounted-for gas, and the greater the ease with which the distribution can be effected. I would not be nice to £200 or £300 upon that point. I do not see any necessity for £600 being expended on workships and offices. £2000 of working capital is not out of proportion to the business done; they have none now, and in that respect they are inconvenienced. Then there are £1500 for expenses of this Act. I am against any expenditure on these works which is not absolutely required, because I think the time will come when it will all be waste. Even taking it on their own showing, the retorts would supply for the next 10 years; and possibly the purifiers and scrubbers will be extended in the same way. £25,000 is a very large sum to ask for; under the circumstances, about half that sum would be fair and reasonable. That would be the same sum they raised in 1868, with borrowing power in proportion. I was rather surprised to hear Mr. Stevenson give the opinion he did, with reference to the sum paid for the old plant to the old association. My opinion is totally at variance with his upon that point. His statements and argument would be correct and sound if the works which they bought had been of such a character that they could be maintained out of revenue in the ordinary way; but those works were in such a condition, or of such a character—I do not know which—that they had to be practically annihilated, and the entire plant swept away. The existing plant has been really all bought out of the £12,500 raised in 1868. I do not quarrel with that expenditure; there was nothing else for it to be paid out of, but regard should be had to the bad bargain, which I heard described as a good one, which they made in the original purchase. Mr. Stevenson says that, if you were to take 16¾ years purchase of the actual profit in 1868, it would work out to £19,000, and that is right, as far as it goes.

The CHAIRMAN: It was a larger figure than that. He said: "This undertaking, if purchased in the usual way in 1869, would have been bought for £23,000, 16¾ years purchase of the net annual profit."

Mr. RICHARDS: But he says that in point of fact the purchase is for £16,500, that is £12,500 for capital, and £4000 by borrowing powers. *Ergo*, the difference between these two sums represents the depreciation in plant, which was reorganized at that time, and which may fairly be set right out of new capital?

Witness: I do not agree with Mr. Stevenson upon that point at all. I think, taking things as they are, which is the outgrowth of the state of things you have been describing, the capital is not represented by as much as £10,000, either in structural or commercial value. I take it that about 22 years purchase would bring you to about £23,000 or £24,000 as the value of the undertaking as it stands, and the capital is all expended, leaving nothing for working capital, nothing afloat at all, everything being absorbed of the £33,000. In point of fact, there is £10,000 absolutely gone, but nevertheless upon that they now ask to pay dividend in the shape of the price of gas. I do not impute blame to the parties for this state of things—it is simply their misfortune—they have to deal with a concern that is worth very little indeed, and this is the position in which they find themselves, and it should be redeemed by good care and management, and not aiming at paying away all the profit that may be earned.

Mr. RICHARDS: So far from its being what Mr. Stevenson describes, an uncommonly good bargain for the company, it seems to have been a good one for the old association?

Witness: It will become a good bargain as time rolls on, and it increases in prosperity; but at the present time the state of things is by no means a healthy one.

Examination resumed: Taking a normal state of things, and not an exceptional year such as 1873, 5s. 8d. is the exact price at which gas could be supplied to pay the maximum dividends upon this enormous amount of capital, and as the concern increases 5s. 6d. would pay. Mr. Stevenson took for his calculations an exceptional state of things altogether. His figures are correct enough, of course, but the state of things is one which tends to mislead. I took down his figures at the time, and followed them, and all I can say is, that I see no reason why, in the normal state of things, the cost should exceed 3s. at the consumer's burner. That is how I make out my 5s. 8d., without going into particulars, upon the quantity sold last year—viz., 21½ millions. I think it would be only fair to the company that they should be allowed a margin over 5s. 6d., and what I would allow would be 6s. That is my deliberate judgment, looking at all the facts of the case, in the event of coals, other than

cannel, being above 30s. a ton. Disputes might arise as to whether the price was or was not above 30s., but I think the proposed model auditor would settle that, and a clause be framed so that there would be no difficulty in working it. Their present great capital, in proportion to their business, is adverse to the consumers. The usual proportion is that the capital should not exceed about four or four and a half times the rental. It is a high state of things if it is five times the amount, but is not uncommon; while seven times, as at Worthing, is excessive. I have known such a thing as ten times, but that was a ruinous state of things. With regard to capital, I think half the amount asked for—viz., £12,500, instead of £25,000—would be enough, with the usual borrowing powers. With regard to the price of gas in places along the coast somewhat analagous to Worthing, there is Folkestone at 5s. Hastings is a large place—there the price was 4s.; but it was raised to 5s. in consequence of the coal famine; Eastbourne, 5s.; Littlehampton, about one-third the size of Worthing, is only charged 5s., though it is fair to say the company ask in their Provisional Order to charge 8s. The price pretty well throughout the country is 5s.

Cross-examined by Mr. O'HARA: I do not know what contest there was in 1868 when the bargain of the present company was ratified by Parliament; but I wish to say that the works were bought at an excessive price considering their character, and that they had to be swept away. If they could have been maintained, I should not have quarrelled with the bargain for one minute. Very likely they were obliged to make the purchase, and it is their misfortune they had to take over works that had to be abandoned. Having heard what Mr. Stevenson said, I think the price paid was extravagant. I agree with Mr. Stevenson as to the rule; but the application was fallacious, as due regard was not had to the loss entailed in the purchase.

Mr. O'HARA: In this case you say the price is not fair, because we ought to have 5s. 8d. in normal years, and 6s. in abnormal years.

Witness: That only goes to the extent of showing my great charity—you have spent a great deal more than you ought—£1000 more; and to meet that, I say you want 5s. 8d. I say distinctly and positively, as my deliberate judgment, that 5s. per 1000 feet ought to be the price of gas at Worthing; but taking things as I find them with this unfortunate company, they having had to give more for the works than they were worth, I would help them out by allowing them more, and that is most liberal.

Mr. O'HARA: You conceded 6s. just now?

Witness: I did under another state of circumstances than the one for which I am now contending. In a normal state of things 5s. 6d. will pay, and adding 10 per cent. to the quantity of gas sold last year would make all the difference next year, so that 5s. 6d. would then do what 5s. 8d. would have been required to do last year.

Mr. O'HARA: You said 5s. 8d. would be required to produce the maximum dividends in normal years.

Witness: So it would, taking the quantity of gas sold last year, and applying it to £38,000 odd of capital. That state of things with regard to capital will not come into existence till you have carried out the extensions proposed in the next twelve months, and then the rental will be 10 per cent. more than it is now. Take the gas sold last year, 21 million odd feet, the capital being only £33,000, 5s. 8d. would not have been required, but 5s. 8d. would have been needed to pay the maximum dividend upon £38,000 odd.

Cross-examination resumed: By their Act of 1868 the company have power to create a reserve-fund. I have not included anything for that in my calculations, but was allowing this continual 10 per cent. growth instead of the reserve-fund. If the maximum dividend be not paid, but only 8 per cent., a fund would be created to meet an adverse state of circumstances that is sure to overtake the company again, for the works will not be sufficient in the course of a few years. They are penned in all round, and it is only a question of time when they will either be abolished or supplemented, and then the company will come to Parliament to put another burden, in the shape of increased price, on the consumers backs. I have heard that the situation of the present works was forced on the company in 1868, but am told on inquiry it was not. They could have obtained a piece of land of five acres, exceedingly well situated, for the money they had to pay for the one acre they now have. Since 1868 the company have spent upwards of £12,000 in the wrong place; they should never have spent it there. I know just such another case as this. The Tunbridge Wells Gas Company are now being redeemed from the same error. Their works were built on a circumscribed spot; they could not burst their bounds, and are now obliged to go a considerable distance out of the town. I was called in to advise them, and said, "In five years you will be so built in that you cannot put up another retort. It is folly to go on those five years; strike now." I know the Worthing Company have ample room for new retorts. I have been over the works, and they are well designed and executed. Nothing has been wasted, not a shilling spent in ornament; nothing more economical could be done. But I say, either from want of moral courage, or from some cause of which I am not cognizant, a mistake was made in spending that money where it has been spent, and it is only a question of time as to when the whole thing will have to be overhauled.

Re-examined by Mr. RICHARDS: The reserve-fund will, according to my calculations, grow out of the extension of business, but Mr. Stevenson in his made some allowance for one. In the course of a short time, 5s. will do what 5s. 8d. is wanted to do at present; but if, instead of quoting a 5s. price, I am willing to admit it should, under the circumstances, be 5s. 6d., the company will soon be in a very good position. Regard being had to the price of gas in any particular place, when the capital is found to be seven times the rental, I feel justified in saying that it is an abnormal state of things.

By the COMMITTEE: Beyond the price of 5s. 6d. I would give a margin of 6d., in case of an unusually high price of coal. It should be left in the hands of a public officer, not an officer of the company, to decide whether the circumstances justified the extra allowance. The auditor to be appointed to represent the local authority would do. I do not think any man would have any difficulty in saying what was the right thing to be done. I would suggest, if the price of coal was above 30s. a ton, then the extra 6d. should be charged. All the coal used in that part of the country is sent from the Thames by rail, which has cut out the seaborne coal altogether. The price of coal does not vary more than 6d. at any of the railway stations in the county. 1s. per ton of coals means 1½d. per 1000 feet of gas sold, but when that 1s. per ton comes into play to any considerable extent, the residual products would be worth something more, and if the increased value of those residuals is put down as one-third of the additional cost of coal, it would bring it to about 1d. per 1000 feet upon the quantity sold.

Mr. RICHARDS then addressed the committee in support of the petition against the bill. He said with regard to the payment of 15 per cent. to the land company at Heene, that it had reference to a district in which the consumption was largely increasing, and therefore in a few years the sum would be an important one. Now, he maintained that the 15 per cent. ought to be deducted out of the sum total applicable to dividend before any dividend was paid. As to the question of supplying Sompting, the consumers viewed the proposition with dismay, as being unnecessary and altogether without the purview of the company's operations; whilst Sompting was perfectly safe, seeing that the Brighton and Hove Company were, according to the promoters own witnesses, extending their arms right and left. Upon the question of additional capital, the learned counsel contended that £12,500 (a sum fixed by Mr. Spice) would be ample to carry on the company for the next 10 or 15 years. With reference to the question of dividend, the petitioners suggested that there ought to be some limitation to their power of making good any deficiency in back dividends; for just in proportion as they possessed that power would the prospect of a reduction of price in the gas be postponed.

Mr. O'HARA, in reply, pointed out that the opponents of the bill relied upon professional witnesses, and had called no residents, while there were no consumers petitions against the bill; and he set off the weight and authority of the evidence of Mr. Stevenson against that of Mr. Spice, in favour of the view that the works were not a bad bargain when they were bought by the company. He defended the present application for capital, on the ground of the cost of these proceedings, and the necessity of postponing for as long as possible the expense of another return to Parliament. He also drew the distinction between a company paying a maximum dividend, and raising capital for the benefit of the shareholders, and this company, which was paying so badly and restricted in its dividend.

The room was then cleared, and, on the parties again being called in,

The CHAIRMAN said: The committee understand that the clauses providing for the appointment of a public auditor, and the maintenance of the proviso respecting coal dues, are assented to by both parties. That being so, we are prepared to pass the preamble of the bill, and think the price should be 6s. 6d. We give the increase of capital, and admit the company extending their supply to Sompting.

The clauses were then read, and, with amendments, agreed to, and the bill was ordered to be reported to the House.

HOUSE OF COMMONS COMMITTEE.

FRIDAY, JUNE 25.

(*Before the Right Hon.* W. E. FORSTER, *Chairman; Mr.* S. B. BRISTOWE, *Mr.* J. G. TALBOT, *Mr.* T. BRASSEY, *and Mr.* H. BIRLEY.)

METROPOLIS GAS COMPANIES BILL.

(*Concluded from page* 109.)

Mr. *Francis S. Reilly*, examined by the CHAIRMAN.

I have been a barrister for many years, and was appointed, under the Act of 1868, one of the commissioners for the revision of price and illuminating power of the Chartered Company in 1873, and of both the Chartered and Imperial Companies in 1874. I have had a great deal to do with metropolitan gas legislation, in various shapes, from 1866 downwards. I drew the bill in that year for the Corporation of the City of London, which may be said to have originated this question. I drew the bill of 1867 for the Board of Trade, and the bill of 1868 for the consumers. I have, since then, done a certain amount of work for individual companies, drawing their bills, and settling some of their schemes. I should like here to make an observation upon what I may call an attack, of a somewhat public character, made upon me. A question was asked in the House of Commons by a metropolitan member, who suggested that I was not impartial in the matter; and I wish to say that any observation of that sort is founded upon the mistake of supposing that the draftsman of a bill is a partizan, or that he forgets he has a duty of impartiality, which may be discharged, like other duties, by persons upon whom it is imposed. I may also say that the drawing of a bill sometimes stops at a very early stage in its progress, and has nothing to do with amendments, or the state of the bill as it is passed. The chief difference between the Act of 1868 and the bill of 1867, as first brought into Parliament, is that the bill of 1867 comprised a clause for a sliding scale, but it was very much objected to, and was struck out in committee *pro formâ*. That bill was brought in by Government, and it was carrying out the resolutions of Sir John Trollope's committee. The meaning of the sliding scale was that the initial dividend was to be 7 per cent., and that upon the lowering of the price it might be increased ½ per cent. per annum, and there was no limit to the increase; but there was no diminution of the dividend of 7 per cent. if a higher price were charged. The committee so far altered the bill that the initial dividend was put at 10 per cent. instead of 7, and it might be increased at a lowering price; but there was still no diminution of dividend at the raising of the price. That bill went to Mr. Cardwell's committee, who not only heard a great deal of evidence, but they also directed the promoters, who were the Board of Trade, to prepare clauses to give effect to the resolutions which they came to from time to time. The chief alteration was that the sliding scale in one way disappeared altogether, and the revision clauses came in instead. The bill of 1868, which ultimately passed as the City of London Gas Act, 1868, was substantially the bill referred to Mr. Cardwell's committee in 1867, embodying the additions and alterations which had been arrived at in the course of the discussion, but which had never passed that committee, with the exception that it was confined to the companies that were in the City, while the report of Mr. Cardwell's committee suggested a general Act, forcing the same arrangement upon all the companies.

By Mr. TALBOT: The Act of 1868 was a private Act, but the bill upon which it was founded was a public bill.

By the CHAIRMAN: The only knowledge I have of the Imperial Act is from having to study it carefully on the revision of 1874. As regards those revisions, I very early arrived at the clear opinion that it was wholly out of our power to deal with the mode in which the companies had raised their capital in years anterior to the year of revision. It has never been proposed, as I understand, that the Revision Commissioners should annul the capital, even to the small amount of £1. The only suggestion was that we should disallow a certain portion of the capital in this sense—that we should not provide for dividend on it. The only thing that could be said, I conceive, was, that when a shareholder took his interest in the company, by subscribing a portion of the capital which was authorized by the Act establishing the revision system, or by a subsequent Act, that he had notice of that revision; and it might be said in some sense that he could not complain if the operation of the revision was to deprive him of some benefit which the company had conferred upon him under their statutory authority. But it seemed to me to be hopeless to contend that Parliament should have conferred two absolutely inconsistent powers upon the two authorities by the same Act of Parliament. With reference to the expenditure of capital, there are some differences, no doubt, and different considerations apply to a certain extent. The discretion invested in the company is not so clearly of a statutory character, with reference to its expenditure, as it is with reference to its creation of capital. There is no statutory right acquired with reference to expenditure; there is no third party, such as an outside capitalist, who is affected by the proceedings of the company, and who therefore acquires rights. Every Act such as the Imperial Act must be taken to go upon the assumption by Parliament that the affairs of the company will be administered with due economy, and that there will be no improper expenditure of capital. In that sense it may be reasonable and right that the mode of expenditure should be afterwards subject to review; but the position with reference to the creation and issue of capital is a much stronger one. If you ask me to refer to the mode in which it worked, I can explain it more shortly. Take the case of the Imperial Company, which is the one with reference to which the question was particularly raised—although we had it before us in the case of the Chartered the year before—that Act authorizes the company to raise and create, subject to such conditions as they may think fit, share capital, either ordinary or preference, not exceeding in the whole £975,000. Then there is a provision that it shall not be lawful for the company in any year to make out of their profits any larger dividend than £7 in the case of ordinary, and £6 in the case of preference capital. What seemed to me probable was that, looking at the Act as a whole, it was impossible to suppose Parliament should have given that discretion to the company as to the mode of issuing its capital

limited only in that way, and at the same time to set up, by subsequent provisions of the same Act, an authority which would interfere directly with that statutory discretion.

The CHAIRMAN: In your inquiry, did you not consider that you were bound to inquire into the expenditure as well as into the raising of capital?

Witness: We inquired into both subjects, more or less, and we obtained an opinion from the law officers of the Crown, and came to the conclusion that we had no power to allow our award to be modified by any question as regards the raising of capital. The expenditure of capital stands in a somewhat different position. We did not disallow in either case the dividend on any capital on the ground of injudicious or excessive expenditure of capital.

The CHAIRMAN: Supposing it had been brought out clearly before you that there had been, in the case of the Chartered, a gross extravagance in their Beckton works, but that it had been actually expended before the year of the revision, would you or not have thought it was a matter that you ought to consider?

Witness: If that expenditure was completely exhausted and entirely disposed of, and had no operation during the year of revision, we should have considered that we could not deal with it.

The CHAIRMAN: I will call your attention to clause 68 in the City of London Gas Act, which appears to me to guide your action more than any other clause; and I take it that the spirit of that clause is that you were to fix such a price as would be calculated to yield a dividend in fact of 10 per cent. on a prescribed capital of the company, if they had been conducting their business with due care and management. Is that the meaning of it?

Witness: That is not exactly the interpretation I put upon it. "If they had been conducting" is an expression which is not in accordance with the true construction of the Act. The collocation of the words, and the whole object and scope of the enactment, seemed to me to show that due care and management are prospective—that the object of Parliament was to secure, as far as might be, due care and management in the year of revision. In fact, it seems to me that there is very little affirmative force in the words at all. What is meant is, that the commissioners are to provide a price, which shall be calculated to yield a dividend on the assumption of due care and management.

The CHAIRMAN: Of course this is a business matter, and you must bring it to a business illustration. Supposing you had found out, or had reason to believe, that there had been very careless contracts for coal, I understand your answer to be that, however careless those contracts had been up to the day at which you were asked to calculate the dividend for the future, you could not take them into consideration; but all you could say to them would be, you must make your estimate upon care in the future?

Witness: No; that is not exactly so, for two reasons. First of all, if the contracts had exhausted themselves, then they would have been entirely out of our consideration; but if, on the other hand, there were contracts running on and continuing to operate in the year of revision, we should have taken them into account, and not only should we have done so, but we did so.

The CHAIRMAN: I can quite understand that that would be my interpretation of the spirit of the clause, but it seems to me hardly consonant with your interpretation of this wording, because it would be purely a past thing, and a thing which, without rendering themselves liable to a legal penalty, they could not escape from for the future?

Witness: It was part of the care and management of the concern, which operates during the year of revision, and continues to affect the prosperity of the business. That care and management ought to be so continued that the contracts should not bind them to an undue price during the year of revision. Supposing they had made a contract which by the light of future circumstances turned out to have been a very unwise or careless one, we should not give them the full price. The expression, "had been conducted," must be taken with considerable limitations. In the Chartered case of 1874, the commissioners stated that, "having regard to the fact that the price of coal during 1873 was considerably above the average of the preceding period of seven years, and was continually falling throughout the year, and to other considerations, we think that, with due care and management, the company should have left a larger proportion of the required coal uncontracted for, and would thereby, in the events that have happened, saved considerably;" and we deducted a certain sum on that account. It was an exceedingly difficult matter to solve what was past and what was future. If a company apply to Parliament for power to raise, say a million of money, they are not bound to call up all at once; the general plan is to call it up at certain periods. The price which will be necessary for the shareholders to obtain the prescribed dividend must depend upon the amount of dividend to be paid. It rests with the discretion of the company whether or not they use the power given them by the Act to call up the capital. Perhaps you will allow me to explain a little more fully the whole of that question of the raising of capital, and particularly with reference to the opinion of the law officers as to our position, as it has been a good deal attacked.

The CHAIRMAN: I think no one attacked you upon that matter. It was your undoubted duty to act as you did, having taken the opinion of the law officers of the Crown. Mr. Cripps will agree with me that it was impossible for you to have acted otherwise.

Mr. CRIPPS: I disclaim the smallest possible imputation upon the commissioners, who took a vast deal of pains about the matter, and who did all they could.

Witness: I do not refer to the personal attack upon me, but my learned friend (Mr. Cripps) used the expression, in opening, that the whole of the time occupied in the inquiry was, as to the mode of raising the capital, wasted.

Mr. CRIPPS: I meant that it was wasted because a great deal of the time was taken up in investigation, before the opinion of the law officers was obtained, and evidence was gone into, subject to the decision of the law officers. When they decided as they did, it became unimportant.

Witness: In such inquiries as that before us, and that before this committee, there is no separation of the issues of law and fact, and it is wholly impossible for a tribunal, whatever it may be, to deal with the subject otherwise than as a whole. Further than that, it has been said by the principal witness for the Metropolitan Board, that we were puzzled; but that was not so, as I, for one, had a very clear opinion upon the construction of the Act, and have heard nothing to shake my opinion since. No doubt it is advantageous and useful to have a confirmation of the opinion of the law officers, but we wanted that opinion, not for our own satisfaction, but in the hope that we should satisfy the consumers, and show that we were right; because a law officer's opinion, besides its relative value, is a sort of conventional authority, and is assumed as decisive. Unfortunately we did not succeed in it. There is great complaint made with reference to the result of the revision, that there was no separation and allocation of the insurance-fund of the Chartered; but there, again, we were entirely controlled by section 68 of the Act, which says that we are to give a price which shall be calculated to yield profit sufficient to pay a dividend and the insurance-fund. We found ourselves obliged to calculate a price which would give a sum to the insurance-fund, although it came out before us that they had never carried any sum to that fund.

The CHAIRMAN: Then the result of the revision was that they allotted profits, which would otherwise have gone to the consumer, to the insurance-fund, whereas in the previous years they had not done so?

Witness: Yes. The Imperial Company have a reserve-fund, and also an insurance-fund, but it has a different name; it is called a contingency-fund. Their reserve-fund was fixed arbitrarily at something like £83,000, because that had been the maximum they had ever attained in their history. It had been reduced to about £40,000 at the time they applied to us, having been drawn on the previous year, and we felt it to be our duty to allot a sum which would make it up to its maximum amount.

The CHAIRMAN: I do not want to make out a case one way or the other, but I want to know whether I am right or not in the supposition that the effect of the revision clauses was to enable the company to make up their insurance-fund and their reserve-fund, at a time when prices where exceptionally high, in a way which in all probability they would otherwise not have done.

Witness: Yes; in one sense that is why the revision is put in for the protection of the companies. I can only judge of the policy of Parliament from its words, and those are that the price shall be sufficient to yield a dividend and a reserve-fund in the case of the Chartered. The object of the insurance-fund is to guard against possible contingencies. In the case of the Imperial Company, the object of the reserve-fund is the equalization of dividends. My colleagues on the revision were Dr. Odling and Mr. Pattison. We visited the Imperial Company's works, but we did not think it necessary to visit those of the Chartered Company.

The CHAIRMAN: When the application was first made, what did you think, in general terms, to be your business, in order to fix upon the price?

Witness: I did not consider that it was the duty of the commissioners to initiate proceedings at all. It was our business to deal with the case as it was presented to us by the contending parties, who were perfectly competent to act for themselves—the Metropolitan Board and the City on the one side, and the companies on the other. We investigated the matter to the utmost extent of our power, and more than once it was stated by us that the matter was not to be regarded as a *nisi prius* case, to be conducted with technicalities, and the parties were reminded that we had independent power of investigation. In fact, we called witnesses ourselves, and made requisitions on the company for information to a large extent.

The CHAIRMAN: I want to ask rather a searching question. Did you feel it your business merely to be convinced that the buyer had not made out any case of want of care and management, or did you think it your business to find out whether the seller was using as much care and management as a well-established private firm would do which depended upon its management for its existence?

Witness: We certainly thought it our duty to look as narrowly as our capabilities and power enabled us into the care and management of the concern, particularly the probable prospective care and management for the coming year. There necessarily was a collision between the two parties, and we to a considerable extent relied upon the effect of that collision, but we inquired for ourselves in every possible way. I think it is very important to have regard to the contruction which those Acts, to a considerable extent, must bear—that is to say, that there is not very much affirmative force in them. What they seem to mean is, that a proper price shall be put, which will give the company all it is entitled to under the Act, provided there is due care and management in the conduct of the concern during the coming year.

The CHAIRMAN: That all really depends upon your interpretation of the word "due."

Witness: It is sometimes regarded as a word of very great force; but it appears to me to be one of the vaguest epithets in the English language. The question no doubt is what is the standard of dueness to be applied to any particular company or to the companies? It is plain that it cannot be a uniform one; you must have regard to the history of the company and its present state and prospects. I do not think it would have been fair to the company to deal with the question on any narrow and insufficient representation.

Mr. BRASSEY: There were a good many details that you really could not get to the bottom of, were there not? For instance, supposing the company is employing 1000 men, it is impossible for any one watching them from the outside, and taking a cursory view of it, to say whether or not the same work could be done with 960 men, or any lesser number?

Witness: Yes, there must be a very great difficulty in exercising such an authority by any extraneous tribunal.

By the CHAIRMAN: I should say that none of the commissioners has had any practical experience in the conduct of a gas business, but I have no doubt Dr. Odling is thoroughly informed as regards all questions connected with the manufacture of gas. We went largely into a comparison of the mode in which the Chartered and Imperial Companies conducted their business as compared with other companies, and we obtained the assistance of Mr. Livesey, Mr. Jones (of the Ratcliff Company), and Mr. Parkes, all of whom we called ourselves. We went down to the Bromley works of the Imperial Company, where we were met by Mr. Kirkham, the engineer of the company; and it was also arranged that Mr. Anderson, the gas engineer who was advising the Metropolitan Board of Works, should meet us, and in that way we obtained all the information we could. It should be remembered that in all these matters it is impossible to have a special tribunal of experts. It is not altogether a question of the burning of coal, but it is a theoretical question to a great extent; or, at any rate, it is a question to be decided on calculation, and upon evidence which is to be produced.

The CHAIRMAN: Do you think that either your revision, or any revision that could be made under the Act would replace the stimulus of self-interest in the company to make gas as cheaply as they could?

Witness: I think Parliament is in a position of very great difficulty in dealing with such a matter. The question proceeds upon the assumption that self-interest is excluded from this system.

The CHAIRMAN: That is very important. How do you think that the self-interest is excluded?

Witness: Because the whole matter, when the revision is over, and the commissioners have fixed a price, is left to the companies, and it is to their interest to conduct their business in the most profitable way, although the price is a high one.

The CHAIRMAN: Surely, it is not all left to the company? Whatever might be the price you fix, they would not be able, if they earned more than 10 per cent., to make use of it?

Witness: In this case it is shown that it could be used, because they have carried money to the insurance and reserve funds, but they cannot divide more than 10 per cent. No doubt one must say that if the price is high the stimulus of self-interest is not so strong as it would otherwise be; but it still remains that there is a great deal of risk and uncertainty. The cost of articles and the employment of men may vary much during the year—and, in fact, we have found it so—and, therefore, their self-interest would strongly induce them not to let their actual expenditure exceed their estimate. It was suggested, in not a very nice form, by one of the witnesses, that the companies expected their estimates to be cut down a great deal more than they were; but I think the gentleman who said that must have forgotten that the evidence was given on oath.

The CHAIRMAN: There does appear to me to be one way in which self-interest would operate under the revision clauses, and that is that whatever the companies obtained by them, they have a great deal of trouble in getting it.

Witness: I should think that they must be considerably influenced by that; in fact, they have said so on many occasions in various forms.

The CHAIRMAN: Have you any suggestions to make to the committee. You have had so much experience, and you have heard what has been stated before this inquiry on both sides.

Witness: It seems to me that no suggestion can be made at all to meet the point of dealing with the raising of the capital. I think, on the other hand, that it is possible, when a proper opportunity presents itself—whether this is one or not, I do not pretend to say—that the arrangements as to the insurance-

fund and the reserve-fund might be altered in the interest of the consumers. I think (and I believe I give the opinion of my colleagues in that respect) that it can hardly be supposed that Parliament contemplated the operation of the insurance-fund in the case of the Chartered Company, because in one sense it ensures 10 per cent. dividend from the commissioners, unless our calculations are exceedingly wrong. In the result we were obliged to calculate 11 per cent., but they were not bound to appropriate that 11 per cent. into two sums of 1 per cent. and 10 per cent., and they used the 1 per cent. legally, under the Act, in making up the 10 per cent.

The CHAIRMAN: They were not really earning 10 per cent., but if they had not an insurance-fund to deal with they would have taken the consequences of your mistaken estimate and suffered?

Witness: Yes; I think Parliament can scarcely have contemplated that result; and although the contention of the consumers was, in my opinion, unsound on the Act as it stands, I think it is a fair question whether the Act should not be reconsidered in that respect. Looking at the Act of 1868, it seems to me that there is a very large number of officials, and I should have thought, regarding the matter mainly as one of public interest, that the official power might have been more concentrated. There are first of all, the referees, who are to fix the standard of the gas and the burners; then the chief gas examiner and an auditor, appointed by the Board of Trade; they are all officials representing the consumer. Then, in the case of the revision, you have the commissioners, such as ourselves, who are appointed as representing both parties; but I should think that if Parliament has an opportunity of reviewing the policy of this Act, it might be very wise to combine those officials into some one body, uniting their functions and giving them proper power. There is a very serious expense connected with the revisions and with such proceedings as these, and what I want to suggest is, instead of having these revisions coming periodically, and as it were by fits and starts, that there should be some system of continuous revision, which might operate better. If you had a body of some sort, which would be continually intervening between the consumers and the companies, and adjusting matters from day to day, there probable would not be the amount of friction which there is in the working of the present system.

The CHAIRMAN: It would be a body which would be really conducting the gas business?

Witness: No, I do not think that at all. You had the evidence of the auditor as to the way he proceeds. He goes to the offices and communicates with the officers, and an amicable communication of that sort is most useful. That principle is also, more or less, to be found in the Act itself, because there is a provision that the Corporation of the City and the Metropolitan Board and the companies may agree on any alteration of the price and illuminating power. Of course the thing would be required to be very carefully considered. With regard to capital, I think the power of raising money by loan, and then converting it into share capital, is a very questionable one. It has been restricted of late by a Standing Order of the House of Lords, which says that no dividend higher than 5 per cent. shall be allowed on the share capital into which the loan capital is converted when the profit is limited, and I can see a clause to that effect in the present bill; but I think it questionable, in the interest of the consumer, whether any such conversion should be allowed; there may be reasons for it, no doubt. The restriction at present existing upon the raising of loan capital—that it cannot be more than a quarter—seems to be hardly justifiable upon any principle. It may be very well when a new company is being constituted, and it has no works and no good security to give, and no share capital invested in its concerns, to restrict it from borrowing; but when you have such great security as these companies are able to give, it seems to me that it would be more reasonable to allow them to borrow to any extent to which the Act will allow them. It might even be possible that the Metropolitan Board of Works, who have power of lending to other bodies, could assist the companies.

By Mr. BRISTOWE: In my opinion there is a great deal to be said in favour of the system of 1860 as against the system of 1868, under which we have been acting, and I think that opinion is quite in accordance with the suggestion I just now made, because if you have anything like a continuous revision it is a system by which the consumers would be continually checking the operations of the gas companies, with whom they are in close connexion. It would be almost necessary that all the parties should be represented; that is to say, that the body which conducted that continuous revision should be a tribunal constituted on the principle of impartiality.

Mr. BIRLEY: Is it your opinion that if the commissioners were appointed, one by the companies, one by the Metropolitan Board, and one by the Board of Trade, the inquiry would be more efficiently conducted than by the present system?

Witness: There is a great deal to be said for that mode of constituting the tribunal. I think it is possible that the consumers would be better satisfied if they had a representative, and I also think the communications with the different bodies would be facilitated. It has been made one great objection to the working of these revision sections that the consumers coming before the commissioners have had great difficulty in obtaining information. In my opinion that objection has been overdrawn and exaggerated, but there is something in it; and I think the constitution of the tribunal in the way proposed would certainly tend to facilitate the obtaining of information. I do not think it desirable, as a matter of parliamentary policy, that the commissioners should have full power to inquire into the question of raising the capital, because it is a thing which cannot be dealt with by them; and I may go further and say I do not see how Parliament itself is to deal with it.

Mr. BIRLEY: Has your attention been drawn to the interpretation which the committee seems to have put upon the question of due care and management in 1867, when they state they are of opinion that the present working expenditure might and should have been reduced, but that it was for the companies in the first place to consider among themselves what would be the most convenient mode of attaining that object.

Witness: I do not think it would be safe to interpret the Act of 1868 with reference to the report of the committee. I have read the whole of Mr. Livesey's evidence in reference to his remarks about experts, and I should say that it is impossible to have a tribunal of experts upon every subject. If any one were to be in difficulties with Mr. Livesey, he would find that the question as to the management of his works would have to be decided by a judge and jury who had never seen the gas-works in their lives.

Mr. BIRLEY: Sub-section of section 68 of the City of London Gas Act is to the effect that the commissioners are to take into account any saving or economy which they shall be opinion might have been effected by amalgamation of the companies, or any of them; did you enter into that question?

Witness: In our memorandum we stated that the Chartered Company had, since the passing of the Act of 1868, amalgamated with five companies, and that they had in contemplation amalgamation with one more company, but that contemplated amalgamation has not been carried into effect. As to whether it would have been effectual or useful, we intimated our opinion in the paragraph, where we said, "The Legislature appeared to have adopted the policy of amalgamation in the interest of the consumers; but it has not been shown that hitherto any very marked benefit has accrued to the consumers therefrom." We did go into that matter, but hitherto that has certainly been the effect as far as we can judge. I ought to say that, as regards the Imperial, there is no provision for amalgamation in their Act, and therefore it did not apply to them.

Mr. BRASSEY: Have you considered at all whether the gas companies might or might not have raised their capital on more favourable terms? Seeing their ordinary stock bears interest at 10 per cent. and commands a high premium in the market, might they not have made application to Parliament for power to raise a certain amount of preference stock at a low rate of interest?

Witness: That is always a question of policy. In some cases a preference capital is spoken of as a sign of weakness. In the present case it might have effected a considerable saving in the interest of the consumers; but all those subjects are before Parliament when the authority to issue capital is applied for, and that is the time for the consumers to deal with the matter.

By Sir E. BECKETT (through the committee): In coming to the conclusion that some of the companies have not raised the capital on the most advantageous terms possible, we had a vague impression that more beneficial arrangements might have been made. In the case of the Imperial, we certainly thought that the conversion of loan into share capital was not in the interests of the consumers.

Sir E. BECKETT: No doubt you remember that that was specially ratified by the Act of 1869?

Witness: That question was gone into. I do not think the proceeding is expressly ratified; it is recited in the preamble.

Sir E. BECKETT: You do not mean that the companies could have raised their capital on more advantageous terms, unless they had gone to Parliament for some alteration of the conditions?

Witness: We did not go into any speculative questions as to the mode of raising capital, for the reason that we thought we could not give practical effect to any conclusion which we might come to upon the subject.

Mr. *W. P. Pattison*, examined by the CHAIRMAN.

I was one of the Revision Commissioners for both the years 1873 and 1874. I consider we had full power to investigate everything for ourselves, and to come to conclusions. We did to some extent go into the question of capital, but we did not modify the final price then fixed on account of the interpretation put upon the Act. In regard to investigations I personally went outside the evidence before us in drawing conclusions. For instance, in one very important matter, the question of leakage of the Chartered Company which appeared to be excessive for the year 1873, I made inquiries abroad, and especially in Paris, and express caution was given to the company that their leakage was thought excessive, and that led to a considerable reduction in the following year. With reference to capital, I individually came to the conclusion that it had not been raised in the interests of the consumers, and that there had been an unnecessary expenditure, but no effect could be given by reason of the terms of the Act. It is evident that the insurance-fund and the reserve-fund rendered nugatory the action of self-interest, inasmuch as there was a sum calculated beyond their 10 per cent. which made up their 10 per cent., so that the revision clauses never can be effected until those funds are revised. For instance the Imperial Company would not have been able to pay their dividend if it had not been for the appropriation of the reserve-fund. Our allowance would not have given them their dividend, and in that way, the moment the company paid a less dividend to their shareholders than they were accustomed to, the self-interest would at once come into play, and make them economize in the manufacture and in the management. I should also say that, with regard to coals, I made independent inquiry amongst the best-informed men in the market, and the information so acquired led me to a different conclusion to that which appeared in the evidence.

Serjeant SARGOOD (through the committee): You have intimated that you thought some of the capital was not raised in the interest of the consumers; do you think it right to give the Revision Commissioners the opportunity of acting on that idea, supposing they thought it well founded?

Witness: I do.

Serjeant SARGOOD: Could you act upon it in any other way than to disallow so much of the dividend as would attach to the amount of capital that you thought had been called up imprudently?

Witness: No; it would be to that extent.

Serjeant SARGOOD: Do you think there would be any chance of getting money advanced upon shares if parties knew that the Revision Commissioners could come and sit in judgment upon them, and say whether or not they should receive a dividend?

Witness: It might diminish the marketable value of the shares, certainly; but it would not at all diminish the chance of getting money. The undue expenditure of capital I would deal with in the same way—viz., by disallowing dividend. In all the companies I would not give a dividend unless the capital was raised and spent. In my opinion, if the company had spent more capital than was necessary to carry on the work, such excess of capital should be disallowed in the price. If, for instance, in establishing works at Bow, the company spent £500,000 when £400,000 would do, I say interest upon the £100,000 should be taken off the dividend. The people from whom I would deduct the dividend would be the shareholders, or whoever had the appointment of the directors.

Serjeant SARGOOD: Assuming that the gentlemen who are directors are men of intelligence, education, and probity, do you think that any of the three commissioners would necessarily be better judges of the propriety of the outlay than the directors were themselves?

Witness: You must know that mistakes in management occur in all companies; and the object of the revision is, as I consider, to bring in the action of self-interest, so that they shall really one and all be compelled, if possible, to manage in the most economical way possible. The commissioners have a better means of forming an opinion, because they would be wise after the event, to a certain extent; and, more than that, the directors acting at the time may have been injudiciously advised by their engineer or manager, who may be mistaken in his ideas.

Serjeant SARGOOD: Are you seriously propounding this theory to Parliament, that three independent gentlemen should be appointed to sit in judgment to judge after the event, and put a penalty upon the shareholders for the blunder of the engineer or manager?

Witness: Being wise after the event means that they have to use their judgment to the extent to which the directors might have foreseen what would happen.

By Sir E. BECKETT (through the committee): In stating that the commissioners ought to have power to disallow the raising of capital upon terms disadvantageous to the consumer, I mean that Acts of Parliament hereafter should be passed on a different footing—that capital should be raised on different terms. I certainly do not mean that the commissioners ought to be allowed to go back upon capital previously raised. My impression is that the Imperial Company had expended capital unwisely. I have seen the works which have been erected since the Act passed, and the works previously erected at Fulham. The expenditure in the latter case appeared to be economical in every respect, but the works at Bromley were exceedingly elaborate; and it seemed to me that if it had been the case of a company competing against other companies for dividend, a great deal of the expense of those works would not have been incurred. The retort-house, in particular, I think was very expensive. I also think the clock-tower and bridge were unnecessarily expensive.

The CHAIRMAN intimated that no statements had been made before the committee reflecting in the slightest degree upon the conduct of the commissioners, and the questions asked had been simply bearing upon the wisdom of that mode of inquiry.

The room was then cleared. After some time the counsel and parties were again called in, when

The CHAIRMAN said: The committee have unanimously come to the conclusion to pass the preamble of the bill, and to proceed with the clauses before taking

the other bills. We have taken into consideration what Sir E. Beckett kindly suggested, and although we do not think it necessary to pass any resolutions which would appear in the formal proceedings of the committee, we have no objection to state our view with reference to two or three of the principal clauses. The principal one is undoubtedly clause 6; and I may state, with reference to that, that we are prepared to accept the principle of a sliding scale, but we think it should be uniformly applied to all the companies. I may state that in passing the preamble we accept the principle of uniformity in treating the different companies under the bill. As to clause 23, we think a burner should be prescribed, in order to keep up a standard measure of price; and, as regards the referee clauses, beginning at clause 9, we think that all the referees should continue to be appointed as at present. I have stated that that is our present mind with reference to these important points, but we have not put them into the form of resolutions, because we do not wish to give them that definitiveness which resolutions would imply. And especially as regards the important matter of clause 6, we have come to these conclusions, because we believe it will conduce to the interest of the companies quite as much as to the consumers, and we also believe that it is proposed *bonâ fide* by the authorities, and with the intention of adhering to it, even should it enable the companies to earn more than 10 per cent. dividend.

Serjeant SARGOOD: When you say you intend it to apply to all the gas companies, do you mean to all who have works or who supply within the metropolitan area, because the whole of those under the bill are only half the whole of those in the metropolis.

Mr. CRIPPS: You cannot raise any difficulty about that.

The CHAIRMAN: I am afraid that that is a very elementary part of the inquiry, in which we may still be in doubt. I thought that the companies that came under the operation of this bill were defined by the preamble.

Serjeant SARGOOD: They are not the whole of the companies within the metropolitan area.

Mr. CRIPPS: They are all the companies under the Act of 1860 which are now affected by this legislation.

The CHAIRMAN: I will put it this way, that we accept the principle of uniform treatment of the different companies under the bill, being those companies that either were existing at the time of the passing of the Act of 1860, or which have been formed by the amalgamation of those companies since.

Serjeant SARGOOD: I am afraid you are not in possession of what our proposition is. Under the Act of 1860, for some reason 13 companies were brought under its operation and seven or eight left out; but if the phrase is used, "uniform treatment of all the companies within the metropolitan area," then this bill falls very far short. There are eight companies that it affects, and eight that it does not affect.

The CHAIRMAN: We do not propose to ask the promoters to include in this bill any companies which are not already under it.

Sir E. BECKETT asked the chairman whether the committee had come to any conclusion about the reserve-fund, and about the initial price.

The CHAIRMAN: We will leave the reserve-fund for the present; as regards the initial price, I think that is a matter for consideration in a clause. We are very anxious that this clause should be finally framed so as, if possible, to satisfy both sides, for we really believe that it involves a principle which is advantageous to both. I think we should be misleading the companies if we give the impression that we thought 3s. 9d. too low a price; but I think I am speaking on behalf of my colleagues when I say that that is a matter which we should not settle at this particular moment, but which might be considered in a clause.

Sir E. BECKETT: When you spoke of a burner, did you apply the burner to the 16 candles?

The CHAIRMAN: We consider that the principle of all the companies being raised to 16 candles is contained within the meaning of "uniform treatment." I meant that to be understood; and I think also, without pledging ourselves in any way, that the impression on our minds would apply to treating the questions of reserve, and contingent, and insurance funds upon the same principle for all the companies.

Sir E. BECKETT: There are two principles at present existing, which do you mean?

The CHAIRMAN: We cannot tell you everything at present.

MONDAY, JUNE 28.

Mr. VENABLES, on behalf of the associated companies, said he had to state that having considered the decision of the committee on the previous Friday, they were extremely anxious, if the committee thought any advantage could be derived from it, to contribute anything they could to the consideration of the details of the bill, but, subject to this, that they reserved their rights, if they should be so advised, to take any course, either in the House of Commons or in the House of Lords, or in the committee of the House of Lords, which they might deem necessary.

Mr. CRIPPS said the promoters could not assent to that which would be an entire breach of the mode of conducting business in all committees. The rule universally was that the parties who were dissatisfied with the decision given, reserved their opposition for another House; but they could have nothing whatever to do with the clauses, or the settlement of them, in the first House, or if they did it entirely prevented their right to interfere in the second House. What his learned friend wished to do was to make this an exception from all rule, or to break the rule at once; to get what he could by clauses, reserving his right to express his full dissatisfaction of the bill, if he did not get everything he wanted, when it got to the other House. He (Mr. Cripps) would be glad to discuss the clauses with the gas companies; but he could not allow them to do that and yet reserve to themselves the right to oppose them in the other House. It was entirely contrary to the rule, and could not possibly be assented to.

After some discussion on the point,

Mr. VENABLES said that, on behalf of the associated companies, he would withdraw from any further share in the discussion of the bill.

Mr. WEST, on behalf of the Chartered Company, said that, with every desire to assist the committee in framing the clauses, he took the same view that Mr. Venables had taken on behalf of the associated companies, and should retire from the committee.

The clauses of the bill were then proceeded with.

Upon clause 8, regulating the pressure, it was proposed to strike out the words requiring the pressure to be taken at the point of supply to "the private consumer," and to insert "at the testing-place."

Mr. *T. W. Keates* was recalled, and examined by Mr. PHILBRICK.

As to the question of pressure, there is this difficulty with reference to taking it at any defined point; the pressure ought to be taken at some point defined at the outset, and I am of opinion that the best place would be after the gas has entered the house in which the testing-room is situated. In that case we should be taking the pressure at the level of the street, which would be fair to the consumers in all cases. There would be no difficulty in that; you would only have to put on the pressure-gauge in the lower part of the house. As the clause stands now it is unworkable; it would be impossible to take the pressure at the junction of the service with the main in the middle of the road.

Cross-examined by Mr. MICHAEL (for the Commercial Company): There is no engineering difficulty in opening the main and testing the pressure in that manner, but it is impracticable in this sense. Supposing day by day you want to test the pressure—

The CHAIRMAN: What is done at present?

Witness: There is nothing of the kind done at present; we work under pressure; that is, the stations are all provided with the means of taking the pressure, and in using the photometer we take the pressure necessarily; that is, we can always ascertain it. The Act requires a certain pressure, but there are no instructions as to recording it.

Mr. MICHAEL: Is it not the fact that, in every Act which has been passed with a clause requiring a certain amount of pressure, this is the test which is put in.

Witness: That may perhaps be the case; but, at the same time, I strongly hold the opinion that it is a very great mistake, and it ought to be altered; it brings the clause into desuetude.

Mr. MICHAEL: Is it not fair that the pressure should be a pressure in the main, and not a pressure subject to accidental circumstances in the building?

Witness: I do not think the pressure ought to be taken at a place where it is subject to many accidents.

The CHAIRMAN: The 84th clause of the City of London Gas Act was like this; therefore you take away from the consumer the pressure he has. When you say it is impracticable, you have worked with that clause since 1868.

Mr. CRIPPS: It is one of those things which they have found an impossibility.

Mr. MICHAEL: It is inserted in every general Act which is passed, and has been applied all over the country, and this is the first time that we have heard any objection to it.

Mr. TALBOT: How long has this alteration been in the bill?

Witness: Almost from the first.

Mr. BRISTOWE: It is not in my original bill.

Mr. CRIPPS: It was marked out in my bill from the very first.

Witness: It appears to me that a private customer is fully protected by having the pressure taken at a point where it enters his house.

Mr. MICHAEL: Do I understand you to say that the clause worded as originally standing in the print is inoperative?

Witness: I do not say that it is unworkable to bore the main and put in a pressure-gauge. There is no difficulty in an engineer going and putting a pressure-gauge on a main, but as a working thing, from day to day, it is impossible. It is impossible to tear up the streets constantly. In the bill as it stands the testings are to be taken daily. I take that as the starting-point. I think it is utterly impossible to keep in the words in the clause, because you could not take up the streets every day.

Mr. MICHAEL: Could not you have a permanent service-pipe put on to the main, which should be the service-pipe at which the pressure should be tested?

Witness: That is exactly what I am saying to meet your objection. Instead of making the test in the testing-room, which may be at the top of the house, I propose to put a pressure-pipe on the service as soon as it enters the house. In the amended bill it is proposed that it shall be tested at the testing-place.

Dr. *William Pole*, examined by the CHAIRMAN.

I am a civil engineer, and one of the gas referees. The objection I see to the proposed amendment, which I suppose has a penalty attached to it if not complied with, is that the pressure at any one place will not give an idea of the pressure at any other place; and that for two reasons, one hydrostatic, and the other hydraulic. A difference of level makes all the difference in pressure. About 10 feet difference of level will make about 1-10th of an inch difference in pressure; so that, supposing that a testing-place is to be 60 feet higher, which is not an unusual difference in level in London, than the consumers main, and you gave 6-10ths pressure at the testing-place, there would be no pressure at all at the place where the consumer lived. And then there is the hydraulic cause of difference; that is, as gas passes up the mains at a certain velocity the effect of that velocity varies the pressure, so that the pressure will be varying continually in different parts of the district, and I hardly see how any testing at any one point, be it where it may, can give evidence of insufficient pressure in other places to found the penalty upon.

By Mr. MICHAEL: The object of a clause of this kind is that each individual consumer shall be ensured 6-10ths of an inch pressure. It is fair that he should be ensured the proper amount of pressure in his service-pipe. If the level is more or less, that is no guide to what the amount of pressure is upon any individual service-pipe of the consumer.

By Mr. CRIPPS: There would be a practical difficulty in each individual consumer testing for pressure in this way, if it was done at every consumer's place, but I do not think there will be any difficulty in establishing a service-pipe with a cap on, by which tests could be taken at different places, corresponding with the conditions in the Act, and being near the consumer's premises. I have, in my own house, a pressure-gauge which tests at all times whether the company give the pressure required by law or not; and though it would not be practicable for every consumer to establish that, there would be no difficulty in making tests from time to time in the different places, so as to see whether the Act was complied with. To have a daily test involves considerable difficulty, unless at a particular place which gives no indication of other parts of the district.

The CHAIRMAN: But by the last edition of the bill the promoters propose that you should certify the testing-places, which you have to do now, but that in certifying the testing-places you should take into account what would be the best testing-places for pressure. Would you be able to undertake the duties combined—that is, seeing what would be the testing-place for purity and pressure?

Witness: We could define a testing-place where the pressure might be taken, and by taking it at a low point in the district might ensure that that was the pressure throughout the district. I think that might be done, but I do not think, supposing we chose a testing-place for illuminating power and purity convenient for that purpose, without reference to the pressure, that putting the test for pressure at that station would afford any indication on which the company would be fined.

The CHAIRMAN: Would the fact that you felt it your duty, in defining the testing-place, to consider the best place for pressure, interfere with your getting the best place for power and purity?

Witness: It would depend upon power and purity.

The CHAIRMAN: Do you see anything in the old clause that is unworkable?

Witness: The old clause is one that has been in practice for some years, and is a reasonable clause.

The CHAIRMAN: I understand an objection to that clause is made by Mr. Keates saying it is impracticable and has not been worked, because it implies pulling up the roads?

Witness: He said that the constant testing of it which should involve penalties would be a matter of difficulty. So it would, if it was done daily; you could not test at many places daily; but so far as regards the clause itself, there is no difficulty in working it, and it is a condition which is just, and which it is proper to submit the companies to, and it would surely be possible to find breaches of that condition, without establishing a convenient testing-place, if the breaches of that condition do occur.

The CHAIRMAN: Do the promoters intend to insist upon the amendment, or will they leave the clause as originally brought in?

Mr. CRIPPS: I think, as far as possible, that if it could be left to the referees it would be desirable. Mr. Pole thinks that daily testing could not be done at the private place of the consumers.

Witness: It would require to be done at so many places, because the pressure at one place gives no indication of the pressure at other places.

Mr. CRIPPS: How could it be done?

Witness: I will read this memorandum, though I did not intend to read it: "The referees could only prescribe that the pressure should be tested, at certain hours, at some fixed station. But this would give no assurance that the pressure should be (as stipulated in clause 8) 6 or 10 10ths 'at the main, near the junction therewith of every customer's service-pipe.' I doubt whether there is any feasible mode of testing, systematically, the fulfilment of the condition of clause 8. If it is desirable that some check should be put on the company as regards the pressure, the only feasible plan seems to be that the pressure should be tried from time to time, at different places, by some inspector appointed for the purpose on behalf of the public; and if found too low, that appeal should be made to the chief gas examiner, on whose report, if unfavourable, the company might be fined;" that would be a way of doing it.

Mr. MICHAEL: Could not it be carried out under the clause as it originally stood?

Witness: I believe if the Board of Works were, under the present Act, to call in an inspector to visit certain spots to see whether the pressure was in accordance with the Act of Parliament, they could do it. It has not been done.

Mr. CRIPPS: Rightly or wrongly, it was supposed the clause could not work?

Witness: The condition on the part of the company has always been in force. I have tested to see if it was in force at my house, and I found it was generally; but I think that the officers of the Board of Works might establish some means of testing at different places, which would check occasionally any departures from the conditions of the Act.

Mr. TALBOT: Then as to the referees; do you think the old clause, as it stood, would work satisfactorily for the consumer?

Witness: I think so.

The CHAIRMAN: It seems to us, on the whole, that the clause should remain as it originally stood in the bill.

Upon clause 13,

Dr. *W. Pole* was recalled, and further examined by the CHAIRMAN.

At present the referees have nothing to do with seeing whether there is or is not pressure. No complaint as to bad pressure can be entertained by us.

The CHAIRMAN: Do you think that it would be out of your power to ascertain whether a complaint was well founded or not?

Witness: The words of the Act are: "The referees shall prescribe and certify the mode to be adopted for testing and recording the pressure."

The CHAIRMAN: The old Act was, "the illuminating power supplied by the companies," and now it is, "the illuminating power and pressure of gas;" it is bringing this clause which we have just passed to a reality; unless you see some good reason against it, we should put it in?

Witness: It gives the referees rather a difficult task, because it is a thing which can hardly be prescribed and certified in a formal way. We, of course, should not shrink from giving any directions as to how it might be done. It would be very difficult for us to prescribe and certify any mode which should ensure the carrying of out the clause just passed, because the pressure varies in different parts of the district, and there is no variation given for the testing station mentioned in clause 20 which will afford any proof of the fulfilment of clause 8. Therefore, what we think is, that they would amount only to recommendations as to what should be done at places other than the testing stations, because I believe the pressure should be tested, not at any fixed station, but at several points in the district.

The CHAIRMAN: It might add materially to your work; but it is in your power, of course, to give an opinion as to any complaint made by the consumer as to want of pressure at his own place?

Witness: Yes; but we should require a staff, which at present there is no provision for, to make the testings; but I think it is the intention of the Act that we should direct what should be done, and we could give directions to the officers of the Metropolitan Board of Works as to how the testings should be made in the district.

Mr. BRISTOWE: Having regard to the fact that you are to certify the places for testing and recording the illuminating power, there would be no difficulty in your having the necessary apparatus for testing the pressure at those places. Whether it is worth much or not is another question; but it would be in excess of your powers, under the existing Act of Parliament?

Witness: The literal fulfilment of this clause would be the easiest thing possible; the question is, whether it would be any use, and whether the companies could be fined for any indications that it gave.

Mr. MICHAEL: I propose a rider to clause 13, which my learned friend no doubt will assent to: "And the gas referees shall prescribe a sufficient number of times of testing, and the number of tests at each time of testing, to enable the examiner simply to ascertain the illuminating power of the gas supplied by the gas companies during the whole of the day of such testing."

The CHAIRMAN (to witness): What are the directions that you give to the testers at the present time?

Witness: I was anxious to bring this matter before the committee myself, because it has been questioned whether what we are doing is in accordance with the Act. We have been in the habit of prescribing not only the number of times of testing, according to clause 33 of the 1868 Act, but have been in the habit of saying that the first test shall be at such a time, the second test at such a time, and the third test at such a time. No objection has been made to that; our predecessors did it, and we continue to do it; but it has been brought to our notice that the Act of 1868 does not authorize us to fix the times when the testings shall take place; it merely directs us to give the number of times of testing, but without saying at what hours they are to take place. I think that obscurity ought to be cleared up. I do not think it is for me to say whether we should or not give the times when testings should take place, but I think we ought to be told whether we shall or not prescribe the times.

The CHAIRMAN: The addition that is proposed by the Commercial Company does not tell you to prescribe the times of testing, but that there shall be a sufficient number of testings at each time?

Witness: I do not see the object of this clause which they propose; it does not seem to me to add anything. The gas referees are directed by another clause, clause 47 of the 1868 Act, to give a certain number of tests which are supposed to be sufficient, and I do not quite see what this can add for the benefit of any party. Perhaps I do not understand it; it does not touch the question which is raised, and which I should like to put before the committee.

Mr. TALBOT: This proposed addition obliges you to give that protection to the companies which now you may give, but are not compelled to give. Do not you read it in that way: "Shall prescribe the sufficient number of times and number of tests;" you may do so, but you are not compelled?

Witness: I do not think we should be limited in this way. It is not prescribed in the Act of Parliament.

Mr. VENABLES (for the Commercial Company): We attach considerable importance to it. Clause 33 is, "The gas referees shall prescribe and certify the mode and number of times of testing."

The CHAIRMAN: I see what the meaning of that is, but I have no doubt that you interpret the present clause 13 to tell you to do what is further detailed in this afterwards, that in prescribing the number of times of testing, and the mode of testing, and so forth, it is your duty to do it, in order to enable the examiner fairly to ascertain the illuminating power of gas; but this is a reminder to you and your successors that this should be done? It comes to nothing, because who is to judge of whether it is sufficient?

Witness: We are.

Mr. CRIPPS, in opposing the alteration, said: Unless there is some very definite object in altering the words of the clause, it ought not to be done.

The COMMITTEE decided that the proviso would not be accepted.

The CHAIRMAN (to witness): You say you want the wording of the Act cleared up?

Witness: Yes; I merely want to point out that clause 33 of the 1868 Act, upon which, I believe, clause 13 is modelled, does not direct us to specify the exact times at which the testings shall take place, and that we have been in the habit of doing so. I do not know whether the committee will direct us to do that, or leave it open as it is. We might be told that under this clause we have no power to do it, and then we should be obliged to refrain from doing it.

The CHAIRMAN: I cannot see how you can say you have not the power.

Mr. PHILBRICK: They have the power, because the Act prescribes that the testings shall be taken within a certain time, and leaves to the referees to prescribe the mode of testing.

The clauses were further proceeded with, and, with amendments, agreed to.

Upon clause 20,

Dr. *W. Pole* was recalled, and further examined by the CHAIRMAN.

This clause changes altogether the position of the testing-place. I do not know that I can throw any light upon it, as to whether the testing-place is to be at 1000 yards from the works or not, except by saying this, that the testing-place in the district does not afford so good a security that the whole of the gas in that district shall correspond with it, as if the testing-place were near the works, because it is not certain that all the gas made at the works shall pass the testing-place if it is in the district. Supposing the company were inclined to do such a thing, it would be quite competent for them to supply certain gas at the testing-place of a different quality to that supplied at other parts of the district. It would be possible, I do not say more than that; but if the testing-place is near the works, as at Beckton, so that the whole gas supplied to the district must pass the testing-place, there is a security that that cannot be done. That is the only question upon the engineering point between the two sites. The object of the testing-place being in the district is to test the gas supplied to that district in the great mains, which branch from the gas-works in all directions. It does not necessarily follow that the gas tested at the testing-place in the district should be similar to the gas which may find its way through other mains into other parts of the same district. Therefore, the test made there might not correspond with the test made in other parts of the district. But in the present arrangements, when the testing-place is close or near to the gas-works themselves, so that the whole of the gas has to pass the testing-place and be tested in its passage, it must follow that it is a fair sample of the gas supplied to the district.

The CHAIRMAN: You will continue to prescribe such a testing-place?

Witness: No; this clause alters it. We should be compelled under this clause to prescribe the testing-place in the district to be supplied, without reference to the position of the works.

The CHAIRMAN: That would not imply that you would not have one at the works also. The works would be in the district, surely?

Witness: No; there are many places in which the works do not supply within a number of miles. There is no testing-place provided for Beckton in the bill.

Mr. PHILBRICK: Not until it reaches the district where it is supplied to the consumer; this Act does not provide for any.

Witness: There is another case at Fulham, where the works do not supply anywhere near themselves; the mains pass away into another district.

The CHAIRMAN: Putting aside all question between the Metropolitan Board of Works and the companies, have you thought whether it is advantageous to the consumer that there should not be a test near the works where the gas is made?

Witness: I think to test the gas that is made at any works accurately, the test should be near the works; at the same time, I am alive to the argument used, that if there is a loss of power in gas in passing through the mains for a long distance, it must be taken into account. Whether there is or not, I am not clear; my opinion is that for gas of moderate power there is no great loss in passing.

By Mr. CRIPPS: I was not to have appeared here as a witness for the companies.

By Mr. BRISTOWE: I do not understand what is meant by "the districts applicable to each station."

Mr. CRIPPS: That is the place in which the gas is to be consumed.

Witness: The objection which I raised was in the interest of the consumer, and not in the interest of the company.

The CHAIRMAN: As to testing in the district or at the place, that was a point that was considerably argued in the bill. It was one of those clauses upon which we said nothing on Friday, because we were in hopes that we should have been able to settle it when we came to the clause. We are in such a position now that it is rather difficult for us to do it, therefore we must now take the clause as it stands.

Mr. CRIPPS proposed to add the words, "district in which the gas is consumed."

The clause, as amended, was read and agreed to.

Upon clause 35, relating to forfeiture for defective power,

Mr. VENABLES objected to the words, "or lesser part," being retained in the clause.

Mr. PHILBRICK was heard in support of the words.

The CHAIRMAN stated that the committee had decided to strike out the words.

Upon clause 45, which provided that the companies should give to the corporation, the Metropolitan Board, and the auditor, and their respective agents, access to their books and documents, and should, when required, furnish to them or any of them all vouchers and information requisite for the purposes of the audit, and afford them or any of them all facilities for the proper audit and investigation of their accounts,

Mr. VENABLES said: The auditor being appointed by public authority must be supposed to do his duty, and this is diminishing his power, and bringing before him two parties to audit in addition to him in an adverse sense, and the effect would be to make a complete arbitration of every audit, especially with clause 46 added. Why should these external authorities come and inspect the books instead of relying upon the audit conducted by a proper officer, and would not it be an inconvenient thing to have discussion and arbitration upon each matter?

The CHAIRMAN (to Mr. Cripps): You do not want this clause so much as you did under the old system; your case for this access to the books was that in making out your case for revision you should have the best possible information; now you have no case to make out for revision.

Mr. CRIPPS: This does not apply to the revision; this is only for another audit.

The CHAIRMAN: In arriving at this clause you were in some way influenced by being able to get at information, and now, when we rely upon the principle of self-interest, the price and the quality are the two things you care about; you therefore take the responsibility off the auditor.

Mr. CRIPPS: We think not. We have considered the matter, and inasmuch as we are at least as much interested as the company, although they keep the books, and have more control than we could have under any circumstances, yet we ought to have the power of seeing them, to be able to point out to the auditor anything that might escape his notice.

The CHAIRMAN: You were able to state before that everything above 10 per cent. belonged to you; that gave you a great power over the matter.

Mr. CRIPPS: No doubt; to that extent we became partners in the surplus money over 10 per cent., but now we are partners in it also.

Mr. BRISTOWE: I feel so strongly upon this point that I could not, under any

circumstances, consent to the clause as it stands. I think, as has been pointed out by the chairman, that you have a public auditor appointed, and in this case a most unexceptional person, but it is altogether contrary to what is right and proper that even a public body such as you represent should have the right to go and examine the books of these trading corporations, and I cannot see the correctness of it being granted. A public officer appointed by the Government is to conduct the audit of this matter, and if when the accounts are published there should be anything wrong, it is open to you to interfere; but it seems to me utterly contrary to all propriety that the consumer, assuming you are representing the consumer, should have the right to go and examine the private books of a company which the officer appointed by Government has done.

The CHAIRMAN: This matter has been debated. I do not know that I hold so strong an opinion as my honourable friend; but I think the balance of argument is against the clause, and it must come out.

Upon clause 46, which provided that the Corporation and the Metropolitan Board might, in case they so desired, appear before the auditor during the audit of, or with respect to, the accounts of any gas company, and before certifying the same the auditors should, if required, hear the Corporation and the Metropolitan Board and the gas company with respect to any matter relating to such audit or accounts,

Mr. VENABLES objected to the clause that it was going further than the one just rejected, and said, it would much add to the auditor's labours, and much diminish his efficiency. There was no necessity now for any stringent provisions about it, because the first profits would belong to the company; and as there was no longer any residuary interest in the Board of Works, he did not see what they wanted.

Mr. CRIPPS: It would be to reduce the audit to an absurdity, unless there is somebody to point out the matter to some judge. There must be a number of things that may not be obvious to him as the matter goes on. You said just now that it was undesirable not to have counsel on both sides before you. The auditor must go to the company for the books, and see that the books are the books of the company that he examines.

The CHAIRMAN: I do not think you gave us any evidence in favour of this clause.

Mr. CRIPPS: We gave the opinion of those competent to give an opinion.

The CHAIRMAN: You yourself gave an opinion, but you gave no evidence.

Mr. CRIPPS: I could have called evidence as to that, but I should have thought that it did not require witnesses. Here are two persons interested in the result of these accounts. I am as much interested as they are in the accounts being properly and carefully audited, and yet I am not to have somebody who acts as an auditor between that auditor and the company.

The CHAIRMAN: Are you not rather going upon the supposition that the price follows the dividend, instead of the dividend following the price? If the price followed the dividend, then you might fairly say that you were as much interested, because if the dividend was not properly arrived at you would suffer; but the principle, I imagine, of the sliding scale is much more that the dividend follows the price.

Mr. CRIPPS: I admit that putting in the sliding scale does not leave us in quite the same position as we were before, of having parties to deal with the matter who have no interest in it themselves; but it puts us in the position of having an equal interest with them. They keep the books; they are not like persons keeping the books between two parties, but they are the books of the company, and being the books of the company, and the auditor having to go to them, we hope to be able to point out any defect that we can in the books.

Mr. BRASSEY: There is no practical difficulty, is there, in communicating with the auditor.

Mr. CRIPPS: We have no right to be before him.

Mr. BRASSEY: You can communicate, surely, if you think there is anything to object to in the accounts.

After some further discussion of the point, the clause was settled as follows:—"A copy of the accounts, before the auditor shall certify the same, shall be forwarded to the Corporation and the Metropolitan Board, and the Corporation and the Metropolitan Board, in case they so desire, shall appear before the auditor; and before certifying the accounts the auditors shall, if they require, hear the Corporation and the Metropolitan Board."

Upon clause 50A,

Mr. CRIPPS submitted a proviso for the purpose of meeting the case of the South Metropolitan and the Independent Companies. He said: We think that their increase of dividend ought not to take place if they are charging more for gas than they are charging at the present time. The South Metropolitan Gas Company can have an increase of price at the present time; if they went to a 3s. 4d. price they might raise their dividend one per cent. We have no objection to their doing that in any other way, but we think the price which is now the price the people are paying ought not to be raised in order to enable them to divide a larger dividend at a future time.

Mr. RICHARDS: I am instructed by the South Metropolitan Company to oppose this. At the present moment the South Metropolitan Company would be entitled to take 12¼ per cent. under the operation of this bill; and, according to the view taken throughout, they deserve it as a reward for their good conduct in working at a 3s. price; and, as I understand the remarks thrown out by the right honourable chairman, your intention was that the thing should operate uniformly upon the companies; that is, if they are in a position to take 12¼ per cent. they are to do so. The instant they see that the thing is likely to operate so that the South Metropolitan Company will take 12¼ per cent., they seek to alter the price, and make the 3s. 9d. price not applicable to the South Metropolitan, and that seems to me inconsistent with good faith.

The CHAIRMAN: I want to put this question to you: do you mean that they should not get the 12¼ per cent. continuing to charge 3s.?

Mr. CRIPPS: If they continued to charge 3s. they could get the 12¼ per cent., but that they should not raise the 3s. to 3s. 6d., or some other price, for the purpose of getting it, I wish very much to leave the matter to the committee. I know what the committee said as to the South Metropolitan, and what they thought as to uniformity; but if this clause is to controvert what was thought right by the committee, there is an end of the clause. We think it may be consistent with your idea of what is fair for the South Metropolitan Company.

The CHAIRMAN: Our opinion of what is fair to the South Metropolitan is that they should not suffer because they have set the example of economy and good management, and if they are immediately able to do it, it is what results from what, for the purposes of the consumers, may be thoroughly good conduct or good fortune. What you want to guard against is that they should get a larger dividend at a higher price than they charge now.

Mr. CRIPPS: If they continue to charge 3s., they would be entitled to divide 12¼ per cent.; that we shall not object to. They may divide 12¼ per cent. out of the next money that they get, but that they should not alter that charge of 3s. in the first instance for the purpose of dividing a larger dividend.

Mr. RICHARDS: My learned friend's position is still more unintelligible than I thought it was. He proposes to say that the South Metropolitan, if they charge 3s., may take 12¼ per cent.; but supposing the South Metropolitan Company think it necessary hereafter to raise their price to 3s. 5d., then they shall not be entitled to take 11 per cent. which they would be entitled to.

The CHAIRMAN: I do not imagine that there is any practical fear, especially judging from the kind of evidence brought before us, that the South Metropolitan will not take what it can get (and I think it will get as much dividend as it can), and go on with its price. This clause would be open to very considerable difficulty, because circumstances might happen that would oblige them to go up, and they would not be able to get the benefit of working the clause between 12¼ per cent. and 10 per cent. The committee cannot accept the proviso.

The manuscript clauses were further read, and, with amendments, agreed to.

The preamble was read and agreed to, and the chairman was directed to report the bill, as amended, to the House.

Legal Intelligence.

GLASGOW COURT OF SESSION.—SECOND DIVISION.

TUESDAY, JULY 20.

THE WATER SUPPLY OF GALASHIELS.

The petition in the action of *The Board of Supervision v. The Local Authority of Galashiels*, which was reported in our last (p. 109), was called on again for further consideration of the report of Messrs. J. and A. Leslie, and of the minute of the Local Authority of Galashiels following thereupon. The counsel for the local authority stated that, in accordance with the desire of the court, they had met on Friday last, the 16th inst., and considered the report of the Messrs. Leslie upon the subject of water supply. The result of their consideration was that they were of opinion that the scheme now reported on differed from the one already adopted only in so far as it proposed to reduce the supply of water from 600,000 to 500,000 gallons daily, with an immediate saving in respect of cost of not more than £500, while the cost of afterwards introducing the larger supply would be much greater; and that, in these circumstances, it would not be advisable, in view of the present and future wants of the burgh, to adopt the alternative scheme of 500,000 gallons per day. At the same time, they felt it to be their duty to intimate to the court that a considerable minority of their number objected to the introduction of such a considerable supply as that of 600,000 gallons, and there was no probability of unanimity on this point; and further, that several of the majority fall to retire at the end of the present municipal year. In these circumstances, they invited the court to decide the question as to whether they were entitled, under the 89th section of the Public Health Act, to bring in a supply for domestic and sanitary purposes, or for the former purposes only, as also whether the local authority should proceed under the Public Health Act or the Local Act. The local authority were anxious to have their choice in this last matter left open to them.

After some discussion at the bar, the court resolved upon and pronounced an interlocutor, finding that it was admitted by the local authority that they were bound, under the Public Health Act, to introduce into the Burgh of Galashiels a sufficient supply of water for domestic purposes; that they, in their answers to the present petition, stated that they fully recognized it to be their duty to take immediate steps for the introduction of an adequate supply, and regretted that diversity of opinion and other difficulties have so long delayed their doing so; that the local authority have hitherto, from these causes, neglected to do what was thus by law required of them, and that obstructions have arisen in the execution of the said Act within the burgh; that the report of Messrs. J. and A. Leslie contains a scheme for the introduction of a supply of water, for domestic purposes, of 500,000 gallons per day; that no objections have been stated by the local authority to this scheme, and that they are bound to take the steps required by statute for introducing such a supply of water according to the said scheme; and ordaining them forthwith to take and carry out such proceedings according to law, and *quoad ultra* continuing the petition until October next.

The LORD JUSTICE CLERK stated that, in the event of the authority electing to proceed under the Local Act, they must come back to the court on the 15th of October.

SOUTHWARK POLICE COURT.—THURSDAY, JULY 22.

(*Before Mr.* PARTRIDGE.)

SINGULAR DISPUTE AS TO GAS-RENT.

Mr. *Henry Shaw*, printer, and alleged occupier of premises in the Borough Road, was summoned by Mr. Allen, arrears collector of the Phœnix Gas Company, to show cause why he refused and neglected to pay the sum of £4 4s. for gas consumed from September to the end of March last.

Mr. *Allen* said that he had had considerable trouble with this case. The gas was cut off at the end of March, owing to the rate not being paid, and the account was put into his hands to collect. When he called at the premises, he was told that Miss Shaw was the occupier, and defendant denied all liability, or that he was in any way connected with the business. He, however, had made inquiries, and ascertained that the defendant was rated to the poor at the time the gas was consumed; consequently he must be the occupier. In cross-examination he said that in the first instance the gas was supplied to the order of Miss Shaw, the defendant's daughter, who had, however, been married to a Mr. Brummall, who was jointly rated with defendant.

Mr. *Collette*, one of the clerks from the vestry office, produced the rate-books, showing that the defendant was rated from September to the end of March.

Mr. PARTRIDGE, after examining the books, said he was perfectly satisfied with the evidence produced by Mr. Allen, and ordered the defendant to pay the money, with 2s. costs.

The *defendant* said it was an unjust judgment, and he should appeal against it, and asked for a case to the superior court.

Mr. PARTRIDGE refused him a case, and told him that he might go to the Court of Queen's Bench for a *mandamus* if he thought proper, and this the *defendant* said he should do.

SALE OF GAS AND WATER COMPANIES SHARES AT DORKING.—An important sale of property, comprising shares in the Dorking Gas and Water Companies, &c., took place at the Red Lion Hotel, on the 15th inst., Messrs. White and Sons being the auctioneers. The property in question included amongst others 16 fully paid-up shares of £25 each in the gas company, sold by direction of the executrix of the late Mr. James Thomas Griffee. There were likewise 10 fully paid-up shares of £10 each in the Dorking Water-Works Company, which, as well as the gas company's shares, were put up in lots of two shares each. The sale of these valuable properties excited a good deal of local interest and attracted a large attendance. For the acquisition of the gas shares especially, the competition ran high, the £25 paid-up shares realizing from £31 15s. each to £33 15s., or an average of about £33 per share; the half year's dividend (7 per cent.) to the 30th of June being included in the sale. Considering that this company's £25 shares were sold by public auction in May of last year at £28 per share, this advance in the value of gas property in Dorking is very remarkable, and says much for the clever and able working of this prosperous company, under the management of Mr. Walter Philps, who has filled the combined offices of manager and secretary for upwards of 20 years. The gas shares fell to the biddings of Mr. Cannon (director), Mr. Walker (director), Mr. James D. Down, Mr. Saubergue, Mr. Thos. W. Marsh, Mr. Worsfold, and Mr. Marriage (Reigate). The water company's shares (£10, all paid) were sold at £7 10s. and £8 per share respectively, the purchasers being Mr. Saubergue, Mr. Wood (director), and Mr. Thos. W. Marsh. At present this company has paid no dividend, but there can be no doubt that in due time it will yield an ample return to the proprietors.

Miscellaneous News.

NORWICH WATER-WORKS COMPANY.

The Half-Yearly General Meeting of Shareholders was held on the 21st inst.—Mr. H. S. Patteson in the chair.

The Secretary (Mr. R. Cooper) read the directors report as follows:—

The accounts of capital and revenue for the half year ending the 25th of March last, now read by the secretary, have been audited in the usual manner, and found correct.

After payment of working expenses, debenture interest, and preferential dividend, the revenue account shows a balance sufficient to pay a dividend at the rate of £5 10s. per cent. per annum on the ordinary share capital of the company, leaving a balance of £397 9s. 8d. to the credit of the next half year's account, and the directors have, therefore, declared a dividend at that rate, which will be payable at the end of seven days from this date.

The directors are able to report that the business of the company is still satisfactory, and that the works are in a state of substantial repair and efficiency.

The Chairman, in moving the adoption of the report, mentioned that the company's works were in a very efficient state, the customers were increasing in number, and the expenses were decreasing, especially in regard to coal. The cost of coal was nearly £300 less than in the last half year.

Mr. R. Chamberlin seconded the motion, which was put, and carried unanimously.

Mr. Hawksley congratulated the proprietors upon the fact that these were not gravitation works, exposed to any of those difficulties that occurred in such works during a heavy downpour of rain. The works were works without risk, and the value of the property was proportionately higher. He had the pleasure of looking over the works that morning, and he must say that the language used in the report did scant justice to their condition and the management of Mr. Ayris. He saw that they were in a substantial condition, and in a state of efficiency. The truth really was that these works—and he believed he knew nearly all the great works in the kingdom—were in a state of better order, of greater efficiency, and (so far as they went) were of a more substantial character than almost any other works with which he was connected. As to the condition of the machinery, he thought he commented on that sufficiently on the occasion of his visit half a year ago, but he must now say that the condition of the machinery at the present moment was perfectly splendid; and he would ask any proprietor who took an interest in machinery to go down to Heigham and see for himself. Considering the wear and tear, and the fact that the works were in constant use from day to day, he would have to admit that such machinery, kept in such a condition, was not to be found anywhere else. Mr. Ayris, whose health, he was sorry to see, had been bad, although he ought not to have done so, would go with him to examine the reservoirs, and they found the water in them so clear that they could see quite to the bottom without anything interposing. On behalf of the public, who were the consumers of water, and also on behalf of the company, who were the purveyors, he could offer nothing but his best congratulations, and he only hoped it would be in their power, as he had no doubt it would be, to carry on the undertaking and retain it in that condition to which the directors and Mr. Ayris had conjointly brought it. With regard to the income and expenditure, he had looked at that too; and upon this he had to remark that the profits were a little below the per centage of the income—below the ordinary proportion which the profits of companies of this description bore to the total income. But this was easily to be accounted for. In the first place, the expenses had increased, the rate of wages paid was higher than it was, and the cost of coal had been greater. The result was that the expenses had been for the moment increased in a higher ratio than the income, and the per centage of profits was less than it had hitherto been, and he might safely say than it would be hereafter. There was, however, much to congatulate themselves upon in this respect; for it must be borne in mind that the water charges made upon the inhabitants of Norwich were exceedingly low. The rental value of this city did not obtain to the same amount as was obtained in a great many other towns, and therefore the income was less in proportion than would be derived from the supply of an equal number of inhabitants elsewhere. Of course the public got the benefit of this, and to that extent the company were losers; but, nevertheless, they were making a steady progress, getting more and more customers—not very rapidly, but still never losing any—and the consequence of this in the end must be, that they would be enabled to arrive at an income ere long which would restore the maximum dividend, from which, he believed, they had only temporarily departed. In the case of this company, the maximum dividend, fixed under peculiar circumstances by Parliament, was remarkably low, and this again, due no doubt to the particular condition of things which obtained at the time the original Act was passed, was also for the public benefit; and, therefore, he might say that, although they were a perfectly successful company within the four corners of their Act of Parliament, yet there was no community in the kingdom which derived greater advantages from its water supply than was derived by the city of Norwich.

The Chairman said he was sure they were much obliged to Mr. Hawksley for his opinion, which was all the more valuable as there was no one who had greater experience of the water-works in this kingdom and elsewhere than that gentleman. As he had before said, it was the feeling of the board of directors that the amount of success which had attended the concern was due to the manager, Mr. Ayris, whom they were now glad to see in better health, at the same time hoping he would soon be quite restored, and that, for the sake of the company and his family, he would not in future work so hard. It was with great pleasure that he moved that their best thanks be given to Mr. Ayris for his valuable services to the company.

Mr. Jarrold, in seconding the vote of thanks, expressed his satisfaction at observing that the cost of pumping was only £208 for the half year, the street repairing £79, and that the whole of the labour for these great works (with the turncocks) £93. These figures showed that the management was economically conducted, and he hoped that they would suggest valuable hints for the members of the corporation who were connected with the company, as to the manner in which certain public works in the city ought to be conducted. No doubt, as the engineer had remarked, the company suffered from the low rentals in this city in consequence of the heavy rates; but then the inhabitants got the advantage of having to pay lower water-rates. The landlords, however, suffered from the lowness of the rents, and, again adverting to the connexion with this company of certain members of the Town Council, he desired permission to say that it was very much to be regretted that such a stupid party feeling prevailed in this city, where pounds, shillings, and pence were concerned, and that such a feeling must be put aside, and all parties work together, if Norwich was not to lag behind in the commercial race with other towns. He could but congratulate the chairman of the company and the directors on the very satisfactory balance-sheet which appeared on the table, and that he trusted Mr. Ayris would be spared for many years to promote the prosperity of the company, and secure to the city the excellent supply of water now obtained through it.

Mr. Ayris thanked the proprietors for this kind expression of their feeling towards him. Mr. Jarrold, he said, was quite right in the observations he made as to the company losing in their income by the rents being so low in consequence of the great rates; but the company also lost in another way, because they had to pay their share of the rates. They had, therefore, to take less with one hand and to pay more with the other than companies in other towns did. It would be seen, from the accounts for the half year, that they had paid, exclusive of income-tax, £505 for rates, which was equal to 1 per cent. on their capital. For many years after the company was first formed they paid £60, then it went up to £100, and now it was over £1000 per annum. Another thing the company suffered from was the small rate—a penny rate—on cottages. Thousands of cottages were supplied at 4s. 4d., 5s., and 5s. 6d., whereas other towns took their 7s. or 8s., according to the local rate. But still the city they all lived in had the advantage of this, and he was certainly proud at all times not only to hear but to know in his own conscience that of all the water-works, there was no place to beat Norwich for its water supply. He hoped to live to be connected with them for many years, and to see the dividend back to 6 per cent.

Mr. F. Brown suggested that they should express their satisfaction with the excellent staff Mr. Ayris had about him, everything being carried on in a most admirable manner by them during the illness of Mr. Ayris.

The Chairman said he was glad Mr. Brown had mentioned this subject, because he was frequently backwards and forwards during Mr. Ayris's illness, and he always found everything going on most satisfactorily.

Mr. Ayris said he had a most excellent staff, many of them having worked together throughout the company's existence, and, as they knew, he most thoroughly appreciated them.

The Chairman, acknowledging a vote of thanks proposed to him and the directors of the company by Mr. Jarrold, for the admirable way in which the concern was worked, said that the object that the directors always had in view was a threefold one—to supply the best possible water, at the cheapest possible rate, and at as good a profit as possible to the shareholders.

This concluded the proceedings.

FORFAR GAS CORPORATION.

The accounts for the past year submitted to the meeting of the Forfar Gas Corporation on Monday last show the following results:—

Charge (Capital Account).

Value of annuities	£15,187	10	0
Less redeemed	177	3	9
		£15,010	6 3
Loans on mortgage		4,000	0 0
Contingent-fund		500	0 0
Proceeds of old material		149	12 0
Stores on hand		230	16 10
Balance on capital account		18	18 2
		£19,909	13 3

Discharge.

Value of works	£15,187	10	0
Debts and expenses connected with transfer	1,238	5	5
Improvements and extensions since passing of Act	3,146	16	5
Paid for meters, &c.	145	0	9
New gas governor	36	0	0
New pipes	26	0	10
Carriages of meters, pipes, &c.	3	14	0
Retort mouths	25	6	6
General completion of works	100	19	4
		£19,909	13 3

Charge (being Revenue).

Balance being per revenue for the year ending June 15, 1874		918	16 1
Gas supplied to consumers		4,853	15 2½
Meter-rents		223	12 0
Residual products		34	6 2
Lime sold		4	15 9
Other products sold		162	9 3
		£6,158	12 6½
Stores on hand on June 15, 1875		£8,086	2 1½
Less on hand on June 15, 1874		991	17 0½
		£7,094	5 1

Discharge (being Expenditure).

Coals, &c.	£2,860 18 3
Carriage	207 13 10
Retorts, bricks, &c.	142 4 3
Lime for purification	68 16 6
General repairs	119 18 7
Repairs on meters, &c.	33 16 4
Miscellaneous carriages	3 1 7
Stationery	38 1 0
Ground annual	5 8 3
Wages, &c.	651 5 5½
Taxes	75 8 9
Interest paid	342 17 10
Annuities paid	659 11 5½
Contingent-fund	250 0 0
Salaries and law charges	163 11 8
Miscellaneous	43 2 8½
Unsettled accounts, June, 1875	1,420 2 11
Sinking-fund	150 0 0
	£7,235 19 4½
Deduct unsettled accounts, June, 1874	785 6 2
	£6,450 13 2½

Abstract of Revenue Account.

Amount of charge	£7,094 5 1
Amount of discharge	6,450 13 2½
Free revenue	£643 11 10½

The auditor (Mr. J. C. Anderson) remarks that since the corporation took over the gas-work nothing has been written off the capital account for depreciation or ordinary tear and wear of works, while about £3500 have been expended in enlarging and renewing the works. A sum of £500 has, however, been transferred from the contingent-fund to the credit of capital, which so far meets the cost of these new works. There is a sum of £250 at present at the credit of the contingent-fund, which might with advantage be transferred to the credit of capital. In future a certain sum should yearly be credited to capital for depreciation of works. That sum the auditor considers should be at the rate of at least 2 per cent. on the capital, or, in round numbers, £400 yearly. But it may be more expedient to write off yearly from capital at the rate of 1 per cent., and to put to the credit of the contingent-fund the other 1 per cent., which would enable the corporation, in any year when considerable additions require to be made to the works, to pay the price thereof wholly or in greater part from the fund, instead of exhausting the borrowing powers, or having to apply to Parliament for additional borrowing powers. Hitherto the sums put to the contingent-fund have about met what is required for depreciation. The arrears of gas-rates, so far as irrecoverable, should be wiped off.

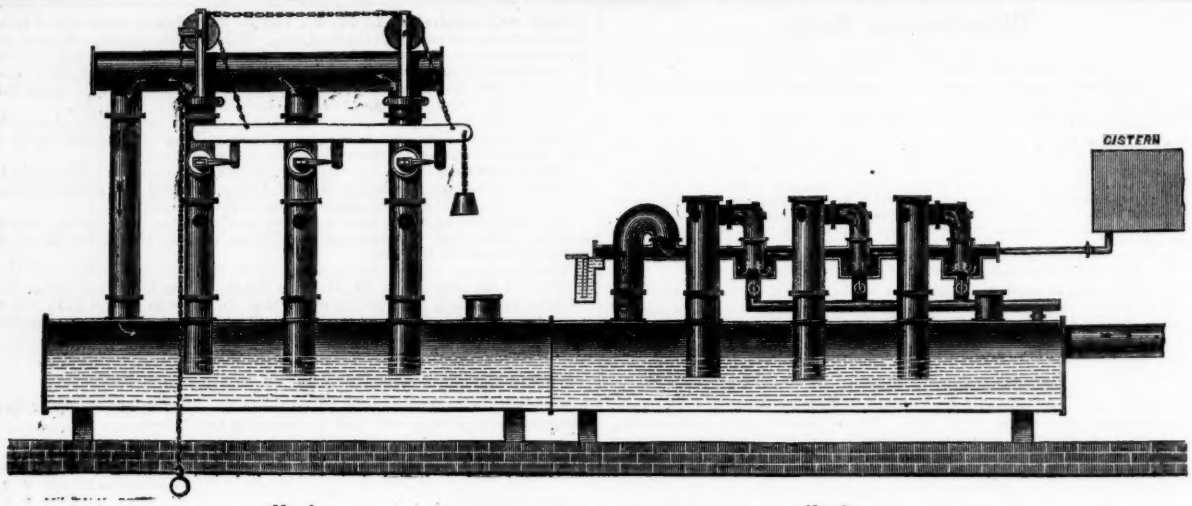
NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

(*Continued from page* 116.)

Mr. J. Gibb (Armagh) read the following paper on

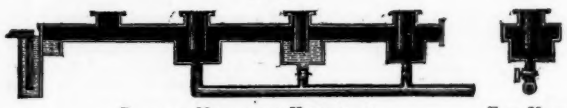
A NEW DIP-PIPE AND BYE-PASS OUTSIDE HYDRAULIC MAIN.

You are all familiar with the many inventions to remove or mitigate the pressure on the retorts caused by the seal of the dip-pipes in the hydraulic main. No doubt these diverse arrangements have their advantages and disadvantages to accomplish the desired end. If any addition can be made that is easy of adoption, and of easy access in time of derangement, it should be worth trying. Mostly, all managers agree that something should be done to remove the pressure on the retorts during the carbonization of the coal; but there does not seem as yet any plan invented to please all parties. I, for one, have not seen any plan or invention that serves the purpose completely, and the plans I have adopted have their defects also. But if they in any wise lead

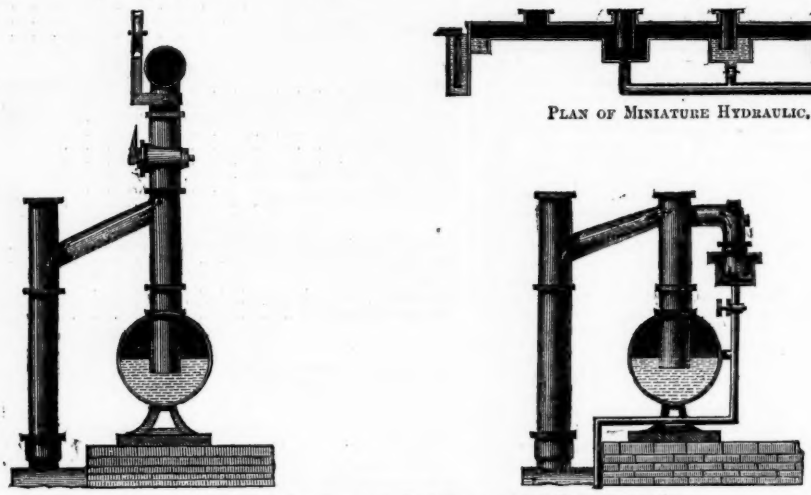


No. 1.

No. 2.



PLAN OF MINIATURE HYDRAULIC. END VIEW.



GIBB'S DIP-PIPE AND BYE-PASS OUTSIDE HYDRAULIC MAIN.

some ingenious mind to devise some method, which we would all wish to see accomplished—namely, something *safe, self-acting, easy of repair, simple,* and *inexpensive,* and *ready of adaptation to existing works,* my object will be accomplished.

In the drawings which I submit for your inspection, you will see that I do not in any way alter the original hydraulic main and dip-pipe. Mr. Clegg was the first who invented the hydraulic main about sixty-four years ago, a plan since almost universally adopted, and with scarcely any deviation from the original design. (See Clegg, 3rd Ed., p. 17.) The seal on the dip-pipe, to my mind, is the safety-valve in gas manufacturing, the same as the safety-valve on steam boilers, and any arrangement taking away that provision endangers the safety of gas-works.

The first plan I have adopted is to take the gas from the upper end of the dip-pipe, and return it back again into the hydraulic main, the arrows showing the flow of the gas. This is done by stop-cocks (see No. 1 drawings), so attached and wrought with a crank that you can open and shut them as required. All that is wanted before drawing the charges, is to shut the cocks by pulling the chains that passes over the two pulleys, and make the ring fast to a catch, and when the men have the retorts charged, take the ring off the hold-fast, and the weight at the other end of the crank will fall and open the cocks again. During the time the men are charging the retorts, the gas passes through the dip-pipes in the hydraulic main the same as usual, so that though the men should neglect to open the cocks, no confusion or danger can happen. You will also observe that each stop-cock has its own handle attached to the crank, so that if there should be any stoppage in the ascension or bridge-pipe of any of the retorts, the pinch-screw can be slacked, and the handle removed, and the cock shut until the obstruction is removed, when the connexions can be again made. Care must be taken to adjust the cocks properly. It has been said that stop-cocks will get clogged with the tar and stop working; but as the cocks are always warm, this does not seem to happen—at least in my experience, in working this plan for the last three months—as the tar seems to have the same effect as oil on steam-cocks.

However, since finishing the above, I have thought of another plan on a different principle, and have also brought a drawing for your inspection. On this second plan I am fitting up three benches, in which you will see I dispense with the stop-cocks altogether, and seal the auxiliary dip-pipes with water during drawing and charging the retorts. This will be seen by referring to the drawings No. 2, in which you will see that the gas is taken out at the back of the dip-pipe, and conveyed into a miniature hydraulic, with pockets cast on it to such a depth as to seal the dip-pipes when charging the retorts, leaving a sufficient space for the gas to travel back into the hydraulic main, the arrows showing the course the gas takes. This seal is made from a cistern containing water, placed above the level of seal in dip-pipe in miniature hydraulic, discharging through a stop-cock, taking about two gallons of water at each time of charging, which is sufficient to seal the three dip-pipes, thus preventing the gas from flowing back into the retorts when drawing and charging. You will notice, at the end of miniature hydraulic, a pocket about 12 inches deep and 4 inches square, with a ¾-inch pipe inserted down near to the bottom, forming a seal, which, when full, will run over, giving notice to the man in charge to turn off the water supply from the cistern.

You will also see, by looking at the drawings, a stop-cock on the pipe underneath the miniature hydraulic, and in connexion with the bottom of each pocket, which stop-cock is shut when the retorts are being drawn, and opened when the retorts are charged, to take away the water that sealed the dip-pipes, and which also serves the purpose of carrying off the condensation of tar and ammonia water back into the hydraulic main during the carbonization of the coal. The water that sealed the dip-pipes is carried by another pipe to the ash-pans, or any convenient exit. Where the ammonia water can be made available, it could be returned into the hydraulic main.

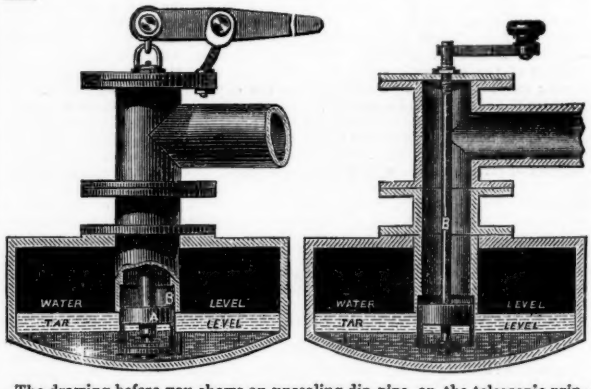
There is also provision made in case of stoppages in ascension or bridge pipes, as you will see, in the drawings, cocks attached to the bottom of each pocket, which can be shut, and water poured into such pocket until the obstruction is removed.

If I have failed to make the working of the above plan plain enough to be understood, perhaps, on referring to the drawings, you will understand them better. I know of no other plan for taking off the gas, *outside the hydraulic main,* by which the alterations on existing works are made more simple and inexpensive.

Mr. G. BOYD (Alloa) read a paper on

TELESCOPIC APPLIANCES FOR UNSEALING OR REGULATING THE SEAL OF DIP-PIPES IN THE HYDRAULIC MAIN.

In again bringing before you the subject of an unsealing dip-pipe, it is merely to show that the ways and means for doing so are not exhausted, although a great many patents have been taken out for that purpose, each patentee claiming a preference for his system over the others which preceded him.



The drawing before you shows an unsealing dip-pipe on the telescopic principle, which has never appeared before. If any of my brother managers here, or any other gas engineer or manager, has a wish to adopt an unsealing dip-pipe, this, on the telescopic principle, if not superior, is at least equal to any other known yet. Instead of parting the dip-pipe to take off the seal, as I did in my last model, I now pull up the lower piece, A, inside the upper, B, thereby improving

on every system that has yet appeared. When the retort has been charged, the stoker has only to pull down the lever, when the same results would necessarily follow as in my former pattern. An unsealing dip-pipe has, indeed, advantages, but it has its defects, too.

What I more particularly mean to bring before you is an appliance for removing or lessening the seal of dip-pipes, on the telescopic principle, which may be constructed of hoop iron, though I would prefer a short piece of cast-iron pipe, A, adjusted to fit into a turned-out part of the dip-pipe; the moveable part is raised or lowered by a ¾-inch rod, B, with a long screw at top, fitted with a jamb-nut, to make that part gas-tight. All the seal that is required is one-half inch or so, so as not to allow the gas to come back when the lid is taken off from the retort mouthpiece. When the retort is idle altogether, the moveable part may be lowered down to make a deeper seal.

If the hydraulic main was made on what, I think, would be an improved principle—viz., instead of a depth equal to the breadth for a D main, it should be only one-half the depth, with a flat curved bottom, instead of a semicircle, as there is no use in allowing a place to collect tar except the tar well, which is specially provided for that purpose.

The hydraulic main might advantageously be made broader, because the liquid forced up into the dip-pipes takes less away in the depth from a broad main than a narrow main, and so also there would be the less necessity for making, as is usual, the seal as deep as from 2 to 4 inches. A deep seal, with anything like good heats, is the great cause of the deposition of carbon, chokes in the ascension-pipes, &c. (I may say that, in my experience, I have had pitch collected from the bottom of the hydraulic main to the bridge-pipes, and had to keep extra bridge-pipes to replace the choked ones, until the pitch could be melted out—which took no little time and trouble—all caused by a deep seal.) The trouble and annoyance I had at that time caused me to think of a remedy. I tried a small seal working in the tar, which did wonders in reducing the annoyance; but, continuing further in the same direction, I introduced an overflow-pipe for taking off the liquid, and over it I placed a piece of pipe 6 inches in length and 2 inches larger in diameter than the outside of the overflow-pipe, to cause the tar to pass off by the bottom of the short pipe, leaving the water at the proper level in the hydraulic main. I have now worked for not less than 10 years (as described) with the best results. I may say I have no carbon deposited in the retorts, chokes are things of the past, and all the other annoyances have likewise fled.

The reason of this doubtless is that the water is so much less dense than the tar, that it presents less resistance to the passage of the gas, which is thus kept a shorter time in the ascension-pipe; the evil results are, moreover, aggravated by the well-known fact that it is the densest and stiffest portions of the tar that are left, because, as is natural, the light portions flow off first.

In conclusion, I pointedly say my own experience is that a shallow-water seal is a perfect preventive of carbon in the retorts, and of stoppages in ascension and other pipes.

Mr. J. G. Hawkins (Sheffield) read a paper on

SELF-ACTING DIP-PIPES FOR THE HYDRAULIC MAINS.

The desirability of relieving the retort from pressure while gas is being evolved from the coal has been long acknowledged, and many devices have been resorted to for that purpose with varying and indifferent results.

The apparatus I am about to bring before your notice is that known as Hawkins's patent self-acting dip-pipe.

These dips were first introduced about two and a half years ago, and since then over 2000 of them have come into use in this country.

A brief description of the apparatus, as depicted in the drawings, may be given as follows:—The dip-pipe is of the ordinary kind, with its lower end inserted into an annular cup. The inner and outer rims of the annular cup are slightly unequal in length, the *shortest* being placed within the dip-pipe. The cup is attached to two rods, which pass through the top of the hydraulic main, where they terminate in a screw and nut. These serve to support the cup and to admit of its being accurately adjusted.

When properly adjusted, the short or inner rim of the cup is slightly below the water-line mark, therefore it will be seen that, when the retort is standing off, the cup must be *full* of liquid and the dip-pipe sealed.

Immediately the retort is set to work and gas evolved, the liquid in the cup is forced down and out over its outer rim into the hydraulic main, whereby a clear gas way is produced.

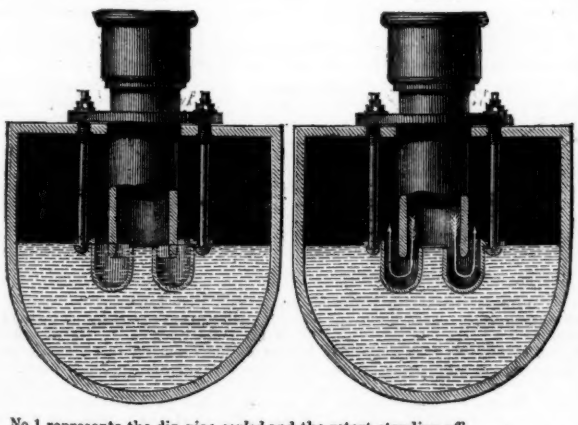
The liquid is prevented from again running into the cup by a slight pressure in the retort, equal to the head of water above the inner rim of the cup, which need not, in any case, exceed one-tenth of an inch.

As soon as the charge is spent, or the retort-lid slackened, whereby the pressure just referred to is removed, the liquid immediately runs into the cup and again fills it up.

It will then be seen by this time that this apparatus has not only the advantage of being self-acting, but that it also consists of a means whereby, by the simple operation of raising or lowering the cup, the pressure in the retort may be brought within any given point, and that too without in any way whatever affecting the seal.

The accompanying drawings, Nos. 1 and 2, are a cross sectional elevation of the dip-pipe and hydraulic main.

No. 1. No. 2.



No 1 represents the dip-pipe *sealed* and the retort *standing off*.

No 2 represents the dip-pipe when the retort is at work and gas is being evolved. The course the gas takes is indicated by two arrows.

The advantages attendant upon the use of such an apparatus are by this time so well understood that any attempt of mine to explain them would be simply wasting your time, and therefore I will leave those points as they are, and content myself with having given you what I hope is a clear description of the apparatus and its workings.

Mr. Watson (Stirling) asked Mr. Hawkins to more fully explain the nature of his invention.

Mr. Hawkins: You can lower or raise the cup at pleasure, and the gas bubbles off in the ordinary way. If you like to have a quarter of an inch of seal by raising the cup, you create a pressure, and so soon as that happens, the pressure acts upon the surface of the water, and presses down upon the level of the inner rim. As the make of gas is reduced, and requires less room to pass away, so the water comes in, and keeps reducing it according to circumstances. When you remove the retort-lid, the water rushes in, and the seal is formed. I think the invention a very good one, and if you try it I am sure you will be pleased with it. I find a little misapprehension existing regarding back pressure. Well, you need not be afraid of that. A gentleman asked me whether the patent would do at works where there is no exhauster. I say yes, because the back pressure does not affect them. The fact is, the two pressures are neutralized, and therefore there is no chance of back pressure, and you need not be afraid of the thing becoming unsealed.

Mr. Key (Accrington): I want to know whether in works with no exhauster, and a seal upon the dip-pipe, the back pressure would not likely bubble back into the retorts. I rather think it would.

Mr. M'Crae (Dundee): My impression is that Mr. Hawkins has converted into a piece of mechanism that which takes a practical form in hydraulics. If you pass gas through a glass tube, you will see the natural formation by the passage of the gas. You will see the cup formed, and Mr. Hawkins has transformed that natural cup into an actual one, and it makes no difference whether an exhauster is working or not, the same result will be attained. The difficulty of that centre opening is this—is there sufficient capacity to allow it to return soon enough. If that is right, then there is no difficulty if it keeps free from pitching.

Mr. Mackenzie: Would Mr. Boyd also give further explanation of the drawings of his apparatus?

Mr. Boyd then at length described the details of his process. He said that ever since he adopted the half-inch seal, he had had no carbon at all. The seal was fixed, and did not require to be raised up or down when it was known what was required.

Mr. M'Crae: You have the same seal always.

Mr. Boyd: You can remove the top one inside, and do away with the seal, if you wish it. I approve of the fixed seal.

Mr. Macpherson (Kirkcaldy): I think your plan might do in a case where there was no exhauster, and where there was heavy back pressure; but where there was an exhauster, I do not think it would apply.

Mr. Boyd: Where it has been tried it has wrought well.

Mr. Key: It appears to me that if there was tar in the bottom it would not work. I have always approved more of the semicircular form for hydraulic, &c., mains, than the flat, and I think, in Mr. Boyd's plan, there should be more room at the bottom to prevent pitching.

Mr. Boyd: Ever since I adopted the present system, I have never seen the tar choke the pipes. Previously I had 3 or 4 inches of dip. My main is 18 inches by 18.

Mr. Peebles (Edinburgh): I think the question of unsealed dip-pipes is still open. Mr. Boyd has given a great deal of attention to the subject during the past few years, and I quite agree with what he says at the end of his paper—that if any one visits Alloa, and asks for a sight of the carbon, he will be agreeably disappointed, for there is none to be seen. The question lies altogether, I think, in gas-works having no exhausters. In doing what Mr. Boyd has done at Alloa—lessening the seal of the pipe down to a minimum—if greater care were taken to render the hydraulic mains suitable, I think the dip might be brought down to a very small point indeed. As Mr. Boyd tells you, the increase of the water in the hydraulic mains is to give you any amount of seal you like. The level of the water is so little depressed in the large area that the small area is filled up, and therefore there need be no great difficulty. He is wise in abiding by his own well-established and excellent plan. But when we look at Mr. Hawkins's model or drawing, we come to a different thing altogether; and two years ago Mr. Livesey, in his presidential speech, gave a description of Mr. Hawkins's patent, and it fully bears out all he stated. So far as I remember, there were three or four points on which he insisted—one was it might be readily applied to existing mains, another was its simplicity of application, and a third was it was self-acting. I think any one who looks on this drawing will see that all those points are made out; and of all the plans brought forward to get away with this shadow—for I think it may be so termed—this far excels all previously submitted to our attention, for beauty of action and adaptability to existing mains. Mr. Boyd has killed his enemy three times—first, by his excellent arrangement of the hydraulic mains; secondly, that appliance shown in Glasgow last year, when he made another stab at his foe; and now here, when he says he is quite competent to kill for the third time. But, still, I think this patent of Mr. Hawkins commends itself to all of you. I have to apologize to Mr. Gibb for not noticing his paper. I am sorry that his drawing is upon such a scale that we were unable to follow him. There should be some advice given to members on this subject. Unless plans are drawn on a large, bold scale, they are unintelligible, and we cannot follow the speakers.

The President: It is quite clear that the united area of these dip-pipes is not equal to the area of the water outside, and it is clear that the liquid outside the dip-pipe must be depressed to a line equal to the bottom of the cup before gas can escape. In other words, the volume of water outside the dip-pipe is infinitely greater than the united area of the dip-pipes, even although you have a considerable height to allow for a heavy pressure. The subject of dip-pipes has received more attention, during the last few years, than any other subject with which we are acquainted in connexion with our business. With regard to the remarks made by the different speakers, although those special arrangements referred to by Mr. Gibb and Mr. Boyd, are very good things indeed, there is one objection which can be urged against them—namely, the cost of their introduction and the complication of arrangements. Therefore, any arrangement which will do away with, or reduce this complication and expense to a minimum, must commend itself to you; an objection which certainly does not apply to the plan brought before you by Mr. Hawkins. I myself examined this arrangement of Mr. Hawkins while in actual operation, and I found that the resistance offered, as indicated upon the gauges, was almost inappreciable. It, therefore, to my mind, most thoroughly fulfils its requirements, and should accomplish everything wished for in this direction. I am remarkably well pleased with the simplicity and cheapness of the thing, and I am inclined to give my verdict in favour of it, although we are indebted to the other friends for having come forward and given us the benefit of their investigations.

Mr. Whimster, jun. (Perth): Perhaps Mr. Hawkins might state the first cost for his dip-pipe?

Mr. Hawkins: The price of a 4-inch dip is 20s., and a 5-inch 25s., which includes the royalty and all other expenses.

Mr. Boyd: I would say that my plan, at the utmost, could be introduced at a cost of not exceeding 10s.

Mr. P. A. Black (Falkirk) read a paper on

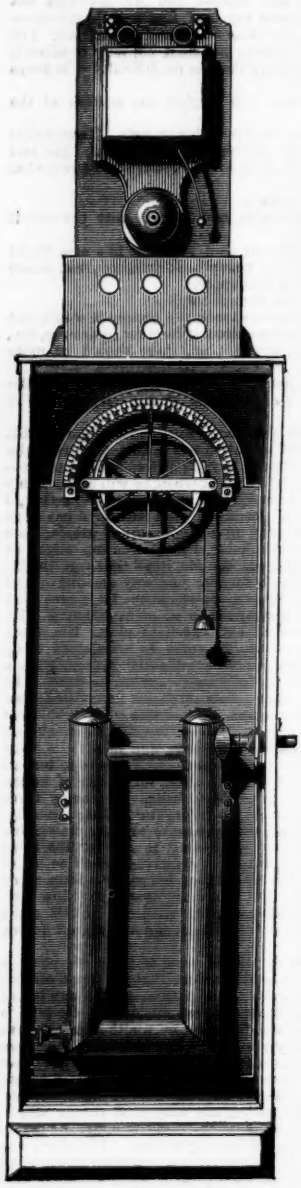
AN ALARM PRESSURE-GAUGE.

Mr. President and Gentlemen,—Having had difficulties to contend with in several gas-works, and more especially in the one of which I am at present manager, by reason of stoppages, overfilled gasholders, and excessive or too low pressure on the main-pipes leading to the different districts, each of which, when they occur, are a heavy loss to the shareholders, and a source of much

annoyance, my attention has been directed for some years back to try and overcome these obstacles by means of some simple method whereby an alarm could be sounded in either of these cases. In the works under my charge great loss is sustained by the condensers being situated at a considerable distance from the retort-house, and not easily seen. I had always a retort-house pressure-gauge on the ordinary system, but have found it very unsuitable, in consequence of the gauge being incapable of drawing the attention of the men, when they were not present in the retort-house, to the too high or too low pressure which might take place.

Within these few years changes of stokers are very frequent, and in small works the stokers have to take charge of the valves, and these are not unfrequently turned the wrong way, in which case a waste of gas immediately ensues.

I have also had to contend with deficient gasholder accommodation, as well as heavy and light gasholders. No doubt the holders can be adjusted to give equal pressure, but I have found, where two gasholders were in use, each giving a different pressure, it was advantageous; and, especially where no exhauster is in use, a difficulty arises sometimes by overfilling, caused either by inattention of the man in charge, or by the heat of the sun expanding the gas. Therefore I considered something was required to draw the attention of the men when each of the gasholders was at a certain height, so that no loss of gas might occur.



I have also found a loss by the carelessness of the man in charge of the governors regulating the flow of gas to different districts, by the excessive pressure which is sometimes put on, and by too low pressure occurring by day. The apparatus overcomes each of these obstacles.

After experimenting for some years with numerous appliances, all of which I found defective and unsuitable, I applied myself recently to the capabilities of that subtle fluid, electricity, as a means by which my object might be attained.

After a careful trial, I have found it thoroughly overcome every obstacle I have had to contend with. It has also the recommendation of economy in favour of its adoption.

With this appliance, every part of the works is under control. The alarm bell can be heard distinctly at a distance of 200 yards. The indicator has also discs; but any number can be introduced. I may mention that this indicator is entirely different from those fitted up in houses, &c. A very great saving is effected. Bells of different tones can be substituted for the indicator, but they are very objectionable.

With regard to the hydraulic main pressure-gauge, it is fitted up in such a way that any pressure exceeding the ordinary pressure, is instantly denoted on the indicator, showing from whence it proceeds, and immediately the bell is in motion.

The simplicity of this gauge may be seen in its capability of being set so as to sound an alarm either by excessive or too low pressure; in fact, by an increase or decrease of one-half inch, the works can be alarmed.

In using an exhauster, this scale is used in the same way. It is able to show 12 inches of pressure, or 12 inches of vacuum. Adverting again to the risk of gasholders becoming overfilled, or by expansion of the gas, perhaps some of the members are, like myself, severely taxed by insufficient storeage capacity. I have about 30,000 cubic feet of holder capacity, and a manufacture of sometimes 74,000 cubic feet per 24 hours. Now, by this apparatus, it is nearly impossible to lose one cubic foot of gas unless through carelessness. In the event of any of the gasholders rising to a certain height (of course the height must be varied according to the season of the year), the falling indicator denotes which gasholder is full, and the bell is at once set in motion.

With the King's pressure-gauge, which is generally used in all gas-works on each main leaving the works, they are fitted up at little expense, so that no excessive pressure can be put on, and too low pressure by day is impossible. Should any of the extremes be attained, the indicator falls, and the alarm is given

The whole apparatus and connexions are fixed into a case, so that control is held over each gasholder, district pressure-gauges, and hydraulic main-gauge.

The object of the self-acting alarm is, first, to thoroughly reduce all unnecessary waste of gas to a minimum as it passes from the hydraulic main to the gasholders; second, to completely overcome the difficulty of overfilled gasholders, causing unnecessary waste of gas; and, third, to reduce the leakage and condensation occurring through the carelessness of the man in charge of the valves or governors, thereby reducing all unnecessary pressure, or too low pressure on the several mains which leave the works.

My apparatus on this principle has been in operation for upwards of six months, and the total expense in upholding the battery power has been only one shilling for the above period.

Mr. M'Crae: Suppose, in supplying a district, you have to increase the pressure every 15 minutes or half an hour from 5-10ths day pressure to 30-10ths maximum night pressure, would you require to shift that pointer to the next stage at which you wanted it to stand; and, if so, would not that entail a great deal of supervision?

Mr. Black: The pin is inserted at the greatest pressure required at any time, and the lowest pressure required during the day.

Mr. Key: I do not think it is necessary that we should discuss this subject at length. I merely rise to propose a vote of thanks to Mr. Black for the great care and skill which he has displayed in connexion with the preparation of his paper and relative models. What he has done is highly creditable to him, and I have much pleasure in moving a vote of thanks to him.

The President: Mr. Black has brought before us a very interesting subject. This is not the first invention of the kind, however. Mr. Mann, of the City of London Gas-Works, some years ago invented an instrument to indicate the pressure upon hydraulic mains, but we have had nothing brought before us claiming to do so much as Mr. Black's plan does. I conceive that the most important duties such an instrument could do would be to indicate the pressure upon hydraulic mains and the working of the exhauster. In many cases it might be desirable to have the pressures upon streets and gasholders indicated; but in large works, possibly, such a necessity does not exist, seeing there are men in constant charge who are not likely to allow such matters to escape their notice. We are all at one, I am sure, in acknowledging with gratitude the value of this paper, and our thanks to Mr. Black for his trouble in preparing it.

Mr. Smith (Aberdeen) read the following paper on

MALAM'S PROCESS OF GAS-MAKING.

At the last meeting of this association, Mr. D. M. Nelson, of Glasgow, read a paper by Mr. A. Malam, engineer and manager of the Dumfries Gas-Works, on his process of gas-making, in which he stated that 30 per cent. more gas could be produced per ton of coals, without any deterioration in the illuminating power—the gas at the same time being rendered more permanent than by the ordinary system, which was somewhat startling.

Although the principles which constitute the science of distilling coal economically, for the production of illuminating gas, have been well understood for many years by practical gas managers, we would gladly welcome any efforts tending to improve the yield and quality of the gas, consistently with the truths of chemical science and commercial success.

The attention of the Corporation Gas Committee of Aberdeen having been directed to Malam's process of gas-making, I was instructed to make inquiries whether permission could be granted to inspect the apparatus and test the process at Dumfries, for the purpose of reporting to them before proceeding further with the extension of their works. This was kindly granted by Mr. Malam; and having been advised by Mr. Nelson that he preferred to be found in his usual way of working, I proceeded there with two assistants to check the observations, and prevent the possibility of mistakes.

I first inspected the apparatus, which differs in no way from the ordinary arrangement of a gas-work, except that the retorts are 12 feet long, and mounted with mouthpieces at both ends, and have only one ascension-pipe to each retort, with jets of water constantly running down them for the purpose of keeping them clean and washing the gas. Four feet of the retort next the ascension-pipe are kept constantly charged with coke, over which the gas passes. This is the chemical advantage which Mr. Malam claims over the ordinary retorts, and by which he states he can produce 30 per cent. more gas from the same quantity and quality of coal.

This, however, is no new invention, but simply a modification of Lowe and Brunton's process, which is fully described in the third edition of "Clegg," pages 125 and 131, wherein it is stated that the gas produced from a fresh charge of coal in one end of the retort, is made to pass over and through a nearly exhausted charge, whereby 35 per cent. more gas was said to be produced.

This caused considerable excitement about the year 1840, and the process was tried in several gas-works, and abandoned, notwithstanding the important advantages said to be derived from it.

I shall now simply lay before you the results of my experiments, which were carried out on Mr. Malam's ordinary way of working.

Four tons of coals (which appeared to be a mixture of Drumpark and Auchlochan) were well broken, and carefully weighed and carbonized in 15 retorts at good fair heats—four-hour charges—yielding 37,500 cubic feet of gas, as measured by the station-meter, and checked by the cubical contents of the gasholder, being on an average 9375 cubic feet per ton, of an illuminating power of 26·49 candles.

From a sample of the same coals I found that by the ordinary system they produce 9488 cubic feet per ton, of 26·29 candles.

From these results you will observe that by adopting Malam's process of gas-making there is no improvement in the production or quality of the gas over the old system, but a loss (which I estimate at from 1s. 6d. to 2s. per ton of coals carbonized) from a waste of fuel in the retorts, and of a quantity of ammoniacal liquor, which, by mixing with the water from the ascension-pipes, has to be run waste.

Mr. Malam informed me, however, a few days after my visit, that he could now work up his ammoniacal liquor to 6° Twaddel, and intended to get it about 12°; but as he did not describe the process whereby he effected this improvement, I cannot give you my opinion on it.

In order to satisfy myself as to Mr. Malam's own workings previous to my visit, I had samples of the tar analyzed by Messrs. John Miller and Day, manufacturing chemists, Aberdeen, who stated that it contained from one-fourth to one-third more light oil and naphtha than is usually present in the tar from the Aberdeen Gas-Works, which distinctly shows that Mr. Malam has not been producing more gas by his process than can be obtained by the ordinary method of working.

These results with respect to Malam's process of gas-making I place before you, and feel assured that you will give them your impartial consideration.

Mr. M'Crae: I would like to ask one or two questions of Mr. Smith, relative to his visit to Dumfries, and to circumstances to which he has not referred, so that we may be possessed of full information before we proceed with the discussion. I do not think that Mr. Smith, in his paper, stated whether or not he had personally met with Mr. Malam on the occasion. I want to know whether Mr. Malam was present, assisting at the operations, or whether the operations were conducted by Mr. Smith in Mr. Malam's presence.

The President: I should also like to know the kind of coke used on the occasion.

Mr. Smith: In reply to Mr. M'Crae, I may state that I arrived in Dumfries the night before I made the experiment. I called upon Mr. Malam next day, about nine o'clock, and Mr. Malam then stated to me that he was not then in a position to allow a trial. He explained that something in connexion with his apparatus was not in proper order. I said that I wanted to have fair results—indeed, I wanted nothing else—to enable me to report to the Corporation of Aberdeen, and that I would call back at any time Mr. Malam would name. We arranged that we should meet again at the end of 12 hours. At the end of the 12 hours Mr. Malam called upon me, and said he was ready. I proceeded to the works with two assistants I had brought with me from Aberdeen. We got the coals weighed out, and Mr. Malam gave instructions to the men for the adjustment of the coke at the back end of the retorts, and also as to the charges. I took no charge of the men; I only took the state of the station-meter, showing the quantity of gas in the gasholders we were to work into, and all other particulars. Mr. Malam carried on the work so long as he remained, but he did not remain till the end. I took no part in the work. The coke appeared to be very good. I am not sure whether it was English or not, but there was small coal mixed among the coke to sharpen it up.

Mr. M'Crae: I think we are deeply indebted to Mr. Smith, not only for

coming here to-day, but for having in so clear, so decided, and in so exhaustive a manner, described his experience of the test made with Mr. Malam's process. I think it is a pity, when we have a gentleman like Mr. Smith coming here and giving us such a statement as he has made to-day, that Mr. Malam should not also be here to tell us what he has to say on the matter. It is a matter of great importance to us all when a person in Mr. Malam's position, either by himself or those under his influence, makes statements which go up and down the country, and which annoy us and cause commissioners or directors to point to the grand results produced by his system. I think in such circumstances we are entitled, as members of this association, to have the gentleman who makes those statements, and who is a member of this association, here, so that he may help us in attaining the objects for which we have been established, by telling us, not only what he has done, but the means by which it has been accomplished. Up to this moment I am not aware of a single practical detail, except what has been stated by Mr. Smith, and we must accept what he has given us, in the absence of Mr. Malam to contradict him. We must admit that Mr. Smith has done for this association, and for gas authorities, a very important work by exposing the fallacy of this system, and I think he has done it admirably, and I personally thank him for it.

Mr. KEY: I beg to endorse everything which Mr. M'Crae has so well said. We have had papers sent to us from shareholders and others, calling upon us to examine this process, and my own directors have also drawn my attention to it, but I have been unable to furnish any information of a reliable or impartial kind respecting it. Now, I hold that meetings like the present are for the express purpose of ascertaining the facts regarding a subject of this kind. Directors, shareholders—indeed, I may say the world, look to us to learn upon what such statements as have been published are based, and on occasions of this kind, when we meet together, details of such a process as that of Malam's should be laid before us, and then we could discuss it, and see what it is worth, and be able to satisfy those who are deeply interested in it. I must say that Mr. M'Crae has put his remarks in such a form as enable me fully to endorse them. I am very glad that we have now a solution of this question, although I am sure we shall be glad to hear what Mr. Malam may have to say at some future meeting of this society.

Mr. MACPHERSON: I am rather astonished at the results Mr. Smith says he obtained in testing Mr. Malam's process. I think there can be no doubt that under this process more gas must be obtained. There is not the slightest doubt we must get more gas, for I would take the back part of the retort to be the distilling part, the back part being filled with red-hot coke; but at the same time it is equally evident that although you get more gas, you reduce the illuminating power. I do not see that much advantage is to be derived from the process patented by Mr. Malam. The whole thing, in my opinion is this—you will extract a greater quantity of gas of a lower illuminating power, and the question comes to be, will the greater quantity compensate for the deterioration in the illuminating power? The plan would be to take a ton of coal and test it by Mr. Malam's process, and then by the ordinary method, and see which would produce the greatest value in sperm candles.

Mr. MONK (Lanark): Would Mr. Smith tell us what was the colour of the heat?

Mr. SMITH: I had no means of testing, but I would say it must have been above 2000°. It was bright red.

Mr. MONK: I went to Dumfries and had a look through the works, and in some of the retorts I saw the finest heats I have ever seen. I should think that a much greater quantity of gas would have been obtained, but I had no time to make any test. Dr. Wallace has stated as the result of his experiments that he got 3000 cubic feet extra. Dr. Wallace says that a ton of coal distributed in ten retorts, without an exhauster, gave 13,565 cubic feet of gas, of an illuminating power of 30·92, or in round numbers 31 candles. In my opinion this process has not been tested at all yet. It must be tested ton of coal for ton of coal of four or five descriptions. This is a subject which must occupy the attention of gas managers and the world generally, and I must say that I have no confidence in this test. In my opinion Mr. Smith was not working with the requisite heat.

Mr. HALL (St. Andrew's): I have been very much disappointed with the statement of the Aberdeen manager, when he told us that he made the production by the ordinary method greater than by Mr. Malam's process. I have never been a believer in Mr. Malam's process, but I have always thought there was something in it. I believe so still, and I incline to the opinion stated by the gentleman who spoke last, that with the coke in the back end of the retorts, and the vigorous heats, there must be a greater yield of gas. I am not satisfied with the experiments made in Dumfries and reported upon by Mr. Smith, and I think the matter must come before us in another shape.

Mr. M'CRAE: I want to know how Mr. Malam gets increased heats. I can heat my retorts till I could burn them down. I do not know who would not be satisfied with a heat of that kind. Why should we not have the same heat as Mr. Malam? In regard to Mr. Monk's statement, I have only to point out that he did not finish the report prepared by Dr. Wallace. He only read a part, and that not the most important. We have only one object to serve—the truth, and, if we are seeking that, there should be nothing withheld. I have taken in the ordinary way 15,000 feet of gas out of a ton of Lesmahagow "wee" coal, and the president, I am sure, could say he has done the same thing. That is no new discovery to those who have been for the last 20 years trying to see what is actually in the coal.

Mr. MACPHERSON: I think the whole truth should be stated. It is well known that Mr. M'Crae's charges are very small, and that is the reason why he is able to get these intense heats.

Mr. M'CRAE: Who is to regulate the charges for my retorts?

Mr. MACPHERSON: I am not pretending to do so, but I was only desiring that the fact should be known.

Mr. HALL: Mr. Macpherson has answered the question as to keeping up heats. With large retorts and average charges, I find a difficulty in keeping up heats; but, by putting in small charges, you can increase the heat. I am quite certain that, with Mr. Malam's process, by continuing the quantity of red-hot coke, he must be able to produce greater heats than many of us.

The PRESIDENT: It is clear to my mind that Mr. Smith must have been working at some low temperature, since he got the low result of 9000 cubic feet. I cannot conceive that, with a temperature approaching 2000°, such a small quantity could have been obtained by this process. No one having any knowledge of the subject can accept the statement that Mr. Malam can obtain a result of 30 per cent. increase with no diminution of the illuminating power. That, I must say, is contrary to all experience. It is well known to many that there is a special temperature required for each kind of coal, and that it varies according to the quality. That is well understood, and it seems to me that the process that can afford the greatest facility for the control of the temperature which may be required to meet the nature of the different kinds of coal, must be that which comes nearest to perfection. I should certainly like to see further experiments made with this process; I think it is due to Mr. Malam and all concerned that we should have these. The subject has been often before us, but yet the results obtained do not seem to be satisfactory; and I should very much like that some steps were taken to more thoroughly test this process, in order that we may obtain a settled conviction as to its nature. How this is to be accomplished is, perhaps, difficult to say, unless you are disposed to act upon the suggestion which I made at the end of my address, by the appointment of a committee of investigation. As I said, the sooner the matter is decided the better. Such a question as this continuing in an unsettled condition gives rise to an amount of anxiety and trouble to all concerned which had better not exist. So long as it remains unsettled, you have people inquiring, "What about this process? Is it not to be adopted?" and so on. We have to reply, and endeavour to answer this question satisfactorily. I hope that some steps may be taken to decide, to the satisfaction of all concerned, whether or not the process has merit. If our friend, Mr. Nelson, has any remarks to make upon the subject, I am sure we shall be delighted to hear him.

Mr. NELSON (Glasgow): I assure you, I had not the least idea of saying a single word upon this subject in the absence of my chief; yet, lest some might consider my silence an admission that the thing was defunct, I must say something. My much esteemed and venerable friend, Mr. M'Crae, told me this morning that he would say something that would astonish me, and I naturally cocked my ears. I confess, like one or two others, I am disappointed with Mr. Smith's paper. He is a gentleman for whom I have every respect, and I respect him the more since this controversy. I respect any man who comes and points out an error, and I thank Mr. Smith for having been the first to give an absolute and distinct statement in contradiction of Mr. Malam's process being valuable. I am very much pleased that he has done so, and I trust he will accept my remarks in the spirit in which they are made. I should like very much that more absolute and persevering criticism should take place, so that the value of the process may be proclaimed, or its worthlessness established. If it should turn out that the process is a myth—a foolish mistake upon Mr. Malam's part—then I shall be a wiser, and probably a poorer man. However, this is altogether aside from the question. The remarks I wish to make are for the purpose of correcting some little misapprehension which has arisen on this subject. My reason for not speaking was this—that I might give an entire field-day to the other side. For my part, I am tired of this theorizing, of this composing of circulars, and writing to this one and the other one. I am longing for some practical results of the process. Mr. Malam is at present in France, and has been for some time; and I may tell you that had he not gone this week, the patent for France would have expired, and a sacrifice of £15,000 in connexion with it made. That, I think, is a very good reason why he is not here to-day. The law in France is, that a patent not adopted within two years after it has been begun, expires. This question of 30 per cent. has been trotted out a great deal since the statement was first made by Mr. Malam. You will all admit that it is usually the case that a patentee sees more value in his patent than anybody else, and upon that principle Mr. Malam made his computation. He simply meant that he could make 3000 or 4000 cubic feet more than he previously did, because his works were not in capital condition. When he may have been producing 8000 feet per ton of coal, another man might produce 10,000; but it is not to be expected that the same increase will take place for the 10,000 as for the 8000. Mr. Malam thought you would make that out for yourselves. But that there is an absolute saving, or increase of 1500 or 2000, I have every reason to believe, from testimony altogether independent of Mr. Malam's testimony, in which I have great faith, and in which the country at large has great faith. In fairness to Mr. Smith, I may say that, since his visit, the washing of the inside of the ascension-pipes has been done away with. Mr. Malam is entitled to thank Mr. Smith, for he may now save the ammoniacal liquor. The incandescent coke left in the end of the retort has the effect of keeping up a higher heat before the charge is put in, and, at the initial part of the charge, I maintain we have a higher heat. There is only one objection I have to Mr. Smith's report, and it refers to the party who made the analysis. I never knew a chemist, who had any respect for his professional character, who did not give you the per centages in hundreds or thousands. In this analysis we are told simply that there was a large quantity of this, and a small quantity of the other thing. We have no data. I could show you a report in pencil, which a gentleman in the North of England sends me, in which the results are summed up in hundreds. That, I consider, is a reliable report, and perhaps Messrs. Miller and Co., of Aberdeen, will publish details of their analysis in vindication of their position as chemists. I should be very sorry indeed were any one to suppose that I would send out any *ex parte* statement. I refer to the only circular I have issued in connexion with this process, and it bears my name. As Mr. M'Crae complained that Mr. Monk had not read the whole of Dr. Wallace's statement, I will supply the omission.

Mr. M'CRAE: I thought this discussion was ended when you, Mr. President, finished your remarks. Are we to understand that the discussion is reopened? because I shall claim the right to reply.

Mr. SMITH: And I shall claim the same right.

Mr. M'CRAE: We are not to allow Mr. Nelson to travel over all this ground and have no right of reply. It is contrary to all parliamentary usage.

The PRESIDENT: I am sure that it would not be satisfactory to the members if we did not allow full scope. Of course you can reply if you wish.

Mr. NELSON: Any one who knows parliamentary usage knows that any one can speak to a point of order. I am endeavouring to contradict misrepresentations which have been made from time to time. As Mr. M'Crae has objected to the portion of Dr. Wallace's report read by Mr. Monk, I will supply the deficiency. Dr. Wallace says: "On the 25th and 26th of September I made a series of experiments at the Dumfries Gas-Works, with a view to determine the merits of Mr. Malam's invention, which consists essentially in leaving the retort one-third full of incandescent coke, and causing the gas produced in the remaining portion of the retort to pass over it; and in the use of water in the ascension-pipes, which are placed at the back of the retorts. The spray of water in the ascension-pipes is found to be necessary to keep the pipes clear, but does not appear to act in any other way. The retorts are wrought at a very bright heat. The natural result of the passage of the vapours over the highly-heated coke is that the lighter hydrocarbons usually found in the tar are decomposed, and the products of decomposition add to the quantity of gas, while at the same time the bulk of the tar is greatly diminished, and its nature much changed. Mr. Malam's tar is thick and inodorous. The ammonia water is allowed to go to waste; but I consider that, by a slight modification of the arrangements, the greater part of it could be saved. The retorts are 12 feet in length, of which 4 feet are kept constantly charged with coke. The experiments were made with Lesmahagow cannel coal, obtained from the Lesmahagow and Longlee Coal Company, and I ascertained from trials in my own gas apparatus that the coal was of the usual first-class quality. I obtained, using charges of 22·4 lbs., 12,450 cubic feet of gas per ton, of an illuminating power of 33·13 candles; the specific gravity of the gas was 620, and the durability by 5 inches flame 67 minutes. Calculated into pounds of sperm per ton of coal, my results give 1414 lbs.; but I need scarcely say that it would only be by very perfect working that equally favourable results could be obtained in actual practice on the large scale. Two trials were made at the Dumfries Gas-Works. In the first experiment a ton of coal, distributed in ten retorts, worked without the exhauster, gave 13,565 cubic feet of gas, of an illuminating power of 30·92, or, say, in round numbers, 31 candles. The equivalent of a ton of the coal in pounds of sperm is thus 1442, which is, undoubtedly, a large and excellent result. Another ton of the same coal was then carbonized, the exhauster being in this case applied. The charge was fully worked off in three hours, and the gas, as measured by the station-meter, amounted to 15,125 cubic feet. Unfortunately, the holder could not contain the whole of the gas, so that, although the contents gave 30·2 candles, I have no doubt that, if the whole gas had been collected, it would have been sensibly less. If the illuminating power is assumed as 29 candles, the equivalent of a ton of coal in pounds of sperm is 1505 lbs. While I am of opinion that, to test accurately the merits of the system, more extended experiments, with better appliances, are required, I consider the results above detailed satisfactory in showing, at least,

that the yield of gas may, by this process, be very considerably increased, and without a greater deterioration in the quality than that which results from the use of high heats in gas-works of the ordinary construction." Mr. Key, I think, was rather premature in thanking Mr. Smith for having settled this question, because Mr. Smith has not settled it, and I do not think, with all Mr. Key's knowledge of gas matters, it is in his power to settle it at the present juncture. With a little patience, and after a delay of two or three months, the matter, I believe, will be settled. I shall be as much delighted as any one in assisting to get such information upon the subject as will lead to its settlement; and this I will say, that, so soon as we get a reliable statement, whether it is for us or whether it is against us, I will publish it widely, whatever the result of it may be.

Mr. SMITH: I would like to ask Mr. Nelson a question: Has the price of gas in Dumfries been reduced below what is elsewhere charged? I think it is important to know this, seeing it is alleged that Mr. Malam is said to be producing more gas from the coal than we can take out of it. With regard to the heats, I had the pleasure of seeing your works, sir, and I say that the heats were as good as at Dumfries. The question is settled, in my opinion, and I shall be prepared to go to the works again, and prove the same thing. I said to Mr. Malam, "Is there anything you can suggest to explain such poor results? This is a miserable report—nothing more than could be attained by the ordinary method." He said the coals were not good. That statement did not appear to me satisfactory, and I hold that the statements which have been made to the public with reference to this subject are misleading.

Mr. M'CRAE: In my opinion the matter is in a nutshell. Mr. Nelson says he expected that I was to astonish him. I certainly expected that he was to astonish me, and prove how 4000 feet extra were to be produced. He has come down to 1500 or 2000, and has revealed to us what should have been revealed at the outset, and what I knew, that Mr. Malam's works were in a very dilapidated condition, and that while he previously got 8000 he now gets 10,000. Really, Mr. Nelson has given a very good explanation, and I have nothing to say except that we are getting light upon the subject.

Mr. NELSON: There is no man whom I would be more loath to insult than Mr. M'Crae; but I object entirely to what he has stated. He may think so, but I never stated that 3000 to 4000 feet more could be produced by Malam's process than by the ordinary methods, and I do not think any gentleman connected with gas-making would believe that. I am simply stating the evidence I have, and the belief I have formed. With reference to what Mr. Smith says, that there has been no reduction in price in proportion to the production, may I ask if he knows the present price, and the price of coal?

Mr. SMITH: That is not the question. The question is this—is the price of gas lower than in any other town working on the ordinary principle? Is it lower than in Aberdeen, Dundee, or Paisley?

Mr. NELSON: Mr. Malam pays a much higher price for coal?

Mr. SMITH: He pays 3s. per ton for carriage. In Aberdeen we pay 8s. 6d. from Lanarkshire, and 7s. 6d. from Fife.

Mr. NELSON: There may be reasons for it, but Mr. Malam pays from 20s. to 22s. per ton. Mr. Malam's misfortune is that he never uses the same coal long enough.

Mr. M'CRAE: Mr. Smith and I have been using the same coal as Mr. Malam gets, and from the same parties. I have been paying 5s. 3d. for carriage from the same pits as Mr. Malam receives the same article from at 4s. 6d.

Mr. NELSON: I am willing to stand corrected as to the coal, but I may say that the price of gas in Dumfries, before Mr. Malam introduced his process, was 8s. 4d., and that it is now 4s. 6d.

The PRESIDENT: And the power?

Mr. NELSON: I fancy the quality is the same. I know that Mr. Malam has been using some five or six kinds of coal during the past two years, but I do not think he knows what he has taken out of particular qualities, as I do not think he has used them long enough.

Mr. KEY: I would like to know wherein the benefit of this process consists. I should like to know what it is.

Mr. NELSON: I think Mr. Key is too late in asking this information, when he has already condemned the process. After what he has said, I do not think that any information I could afford him would enlighten him. I have never been a patentee, you know. All that is claimed for Mr. Malam's process is the application of water, either inside or outside the ascension-pipes, to cool the gas, and prevent the choking of the pipes. I do not think Mr. Malam's process provides for anything beyond that. Mr. Malam claims no patent for the coke arrangement.

Mr. MACPHERSON: The whole of Mr. Nelson's remarks tend to show that, in works which are well conducted, there is no necessity for the patent. What he has said is, that if a work is properly remodelled and conducted, the present process may do as well as Malam's.

Mr. NELSON: I do not think I have been telling you that. Suppose you had two works side by side, producing a certain quantity of gas, I am satisfied in my own mind, and from evidence I have got outside, that if one of those adopted Malam's process, 1500 or 2000 feet per ton of coal more would be taken from it than from the other.

The PRESIDENT: I have frequently caused the plugs to be lifted before the hour of charging became due, in order to prevent bad gases getting away, proving that there is a point, with regard to heat, beyond which we should not go. I think any value which can be attached to Malam's process lies in this—that in using very rich coal, intense heats may be employed with advantage. In the use of rich coal, I can only conceive of an advantage being gained by using incandescent coke. I certainly could attach no importance to it with the use of the ordinary coal.

The reading of the next paper was then proceeded with.

(To be continued.)

METROPOLIS WATER SUPPLY.

Major Bolton's report for June states that throughout the month the condition of the water in the river Thames at Hampton, Molesey, and Sunbury, where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was fairly good. The highest flood state of the river at Hampton during the month was 6 inches above the (6 feet) summer level, and the lowest 1 inch below. At Seething Wells, Kingston, the state of the water in the river was good on 16, and indifferent on 14 days. The highest state of the flood water at this place was 5 inches above, and the lowest 1 inch below summer level. The highest temperature of the water during the month was 66°, and the lowest 60°, while the highest temperature of the air at the same place was 75°, and the lowest 55°. These observations were made daily at 9 a.m. The rainfall during the month was 2·0 inches.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

The iron trade proper of Sheffield and the surrounding district continues very quiet in the majority of its departments, and there does not appear to be any likelihood of an early alteration. People in all branches both of the iron and steel trades are very naturally trying their utmost in order to secure, or rather attract, orders; but they do not meet with an amount of success anything like proportionate to their efforts; neither lower prices nor other slight concessions being, apparently, able to cause an influx of favours from buyers. A very quiet feeling prevails—a feeling which may, in fact, deepen very considerably should the present reports as to the harvest prospects be fully borne out. Much is always felt to depend upon the nature of the harvest in Great Britain, in relation to the iron and hardware trades, so that now that this is everywhere being seriously prejudiced by the floods, in addition to the great destruction of the cereal crops in other countries, much apprehension is felt.

I do not gather that the recent reductions in other districts of the price of pig iron has had any general effect here, beyond causing a depression in the market, of which the buyers have taken advantage to secure opportunities of negotiating on somewhat lower terms. Agents for Cleveland general makers brands of pig iron now quote as under:—No. 1 foundry, 56s. 6d.; No. 2 foundry, 53s.; No. 3 foundry, 50s. 6d.; No. 4 foundry, 49s.; No. 4 forge, grey, 48s.; No. 5 forge, mottled, 47s. 6d.; No. 6 forge, white, 47s.; refined metal, 68s.; Kentledge, 56s. 6d. and cinder pig, 41s. per ton, net cash.

Merchant iron is unchanged in price at £8 to £8 5s. for common bars, £9 to £9 10s. for medium, £10 good, and £12 to £12 10s. for best, such as the J. B. brand. Hoops are £11 to £11 10s., and sheets £12 10s. to £13 10s. per ton at the works.

The brassfounders are quite as well engaged as when last referred to in these columns. There is a steadily good and extensive inquiry for taps, cocks, hydrants, meters, and all other kinds of plumbers, gas, and water fittings. The establishment of Messrs. Guest and Chrimes, Rotherham, still leads the van in this branch. The firm is at the present time constructing the largest water-meter ever made at these works. It is for the Wakefield Water-Works, and will have a 12-inch inlet-pipe.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

A slight improvement in the demand for the commoner qualities of finished iron is the principal feature of the week, a further concession in prices, though of trifling extent, appears to have brought out some fair specifications, and many of the mills and forges are again running full time. Unmarked bars have been dealt in at £8 per ton, and sheets (singles) are on offer at £10 15s. per ton. There is still a steady inquiry for galvanized roofing sheets, chiefly on account of the Australian market; bars and angles are also in somewhat improved request.

Branded iron is still firm on the basis of £10 per ton for bars. The leading makers are moderately well employed, and the general prospects of business, though not very satisfactory, are rather more encouraging.

In pig iron the market is quiet, but steady. Native all-mine hot-blast may be had at £4 5s. per ton, and cold-blast ditto at £6 per ton. There is a good demand for pigs for foundry consumption; but the forge qualities continue rather slow of sale.

The coal trade is without noteworthy alteration, the threatened strike of the enginemen in the Cannock Chase district has slightly stimulated the demand for household qualities; but as a rule the demand is very languid, and prices, though without much actual change, have a slightly easier tendency.

At Wednesbury the wrought tube and fitting trades at length show signs of improvement, and it is hoped that the recent reductions in fuel and raw material will enable makers to compete more successfully with foreign rivals.

The failure is announced of the Britannia Tube Company; but it is understood that the liabilities will not be heavy.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

The coal trade continues very dull, and sales are being forced at low prices, the recent reductions apparently having been too small to have any steadying effect upon the market. The house coal trade is very quiet, as stocking has not yet commenced, and the demand for all other classes of fuel is dull, but stocks at the pits in the Manchester district are still far from heavy.

In the St. Helen's, Wigan, and Tyldesley districts there is no improvement in trade, and everything is extremely flat. There is very little demand either from the iron-making or chemical works, and the recent wet weather put a stop to brick-making; the demand for shipment is also still very small. Prices are weak, but not materially lower than those last quoted. In the Ashton district there has been a gradual lowering of rates during the last week or two, so that prices there are now on about a level with those in Oldham.

The gas coal trade remains much about the same as last reported. In some few cases colliery proprietors are fully sold for the present season, but generally only a portion of the requirements of consumers has been contracted for as yet, many of the buyers apparently preferring to take their chance of the market. Prices as a rule are without material alteration.

The coke trade is still very dull, and prices are easier both for local makes and Durham foundry cokes; the latter delivered in this district are quoted at 25s. 6d. per ton, but large orders can be placed at less money.

The result of the private meeting between representatives of the masters and the colliers in the Oldham and Ashton districts, to which I referred in my last report, has been that the men continue at work, and the reduction in wages is being settled by a reference to the books to ascertain the prices now being obtained.

The iron trade shows no sign of improvement. There is very little inquiry for either raw or manufactured iron, and consumers who are inclined to buy, quote extremely low prices for orders. No. 3 Middlesbrough pig iron, delivered in this district, is quoted 57s. 9d.; No. 4 foundry at 56s. 9d., and No. 4 forge at 55s. 9d. per ton. Good Middlesbrough bars are quoted at £8 7s., and puddled bars at £5 14s. per ton delivered.

The majority of the iron-works are still very badly situated for orders, the forges are very quiet, and only a portion of the furnaces are in blast.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

There is not much change to note in the coal trade since last week. The household and gas business continues to be dull, and there are a considerable number of prices current in the market. Indeed, they very much depend upon the requirements of the collieries. There appears to be an abundance of coal on offer, and shipping turns are tolerably sharp. The crisis in certain commercial houses connected with the coal trade of Newcastle, which we noted last week, has been got through without doing any apparent further mischief.

There was a very good supply of coasting vessels last week, with a steady demand for handy ships, and a fair rate of freight offered. In consequence of the advance in the price of corn in the home markets, a good deal of steam tonnage has been drafted into the Baltic to load corn there for the United Kingdom. Freighting business has also improved to and from the Mediterranean.

The iron trade of the Cleveland district, and of the North of England generally, shows no improvement at all. The foreign shipments are still limited, and the home business is very poor indeed.

There have been large exportations of fire-bricks and fire-clay retorts, and other fire-clay goods, to the Continent, especially to Germany and the Baltic ports. The cement trade, which has had a hard struggle of competition with London makers, is looking up; increasing quantities are being shipped abroad. The exportation of chemicals is very good; considerable quantities are being sent to all parts of the Continent. The exportation of iron is very moderate indeed. Iron girders are being brought to the Tyne from Belgium.

The reservoirs of the water companies in this district have been well filled

with the recent heavy rains, and in every particular the position of the water-works companies in Durham and Northumberland is the very opposite of what it was last year at this time, when the managers were at their wits end with the drought. The fall of rain in the North of England has not been excessive, and none of the rivers have been flooded.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

My budget of news notes was so full last week that I omitted to make reference to the quarterly report by Professor Brazier, on the quality of the gas supplied to the city of Aberdeen. Considering the high illuminating power and low price of the Aberdeen gas, it would scarcely be right to fail to notice the report. Professor Brazier made three visits during the past quarter—on April 20, May 22, and June 5—and on each visit he made two observations, the mean illuminating power on each occasion being respectively 30·17, 30·44, and 29·30 standard candles. The gas was also tested several times for sulphuretted hydrogen, ammonia, and carbonic acid, and upon no occasion could more than traces of ammonia and carbonic acid be detected.

The annual meeting of the Kirkcaldy Gas Company was held last Wednesday evening, when it was unanimously agreed to reduce the price of gas from 5*s.* 10d. to 5*s.* per 1000 cubic feet. A dividend of 7½ per cent. was declared, which was considered very satisfactory.

On the previous day, the annual meeting of the Berwick Gas Company was held in the Corn Exchange. The directors reported that there was a net profit of £1126 12*s.* 3d. for the year, available as dividend, and recommended a dividend of 10 per cent. upon the capital of the company. They further reported that, encouraged by the more hopeful state of the coal market, they had resolved to reduce the price of gas from 7*s.* 6d. to 6*s.* 8d. per 1000 cubic feet. The report was unanimously approved of, and the retiring directors and other officers of the company were re-elected.

Some days previously the East Wemyss and Buckhaven (Fifeshire) Gaslight Company held their annual meeting. A report, giving a detailed account of the business for the past year, was submitted, and unanimously approved of. The usual dividend of 6 per cent. was declared. The manager, Mr. Blair, was present, and received the warm thanks of the meeting for his unremitting care and attention to the interests of the shareholders. A reduction of 10d. per 1000 cubic feet having recently been made on the price of gas, it was resolved to make no further reduction on the occasion.

On the evening of Thursday week, the shareholders of the Leven Gaslight Company held their annual meeting at Alexandria, Dumbartonshire, when a dividend of 10 per cent. for the past year, on the original cost of the shares, was declared. It was agreed, on the recommendation of the directors, to reduce the price of gas 10d. per 1000 cubic feet.

At Peterhead a reduction of 1*s.* 8d. per 1000 feet has been made on the price of gas, the rate for the current year being 8*s.* 4d., and dating from Whitsunday.

The Greenock Corporation gas accounts for the past year have been laid before the Police Board of that town, but the consideration of the report has been deferred. They show a considerable surplus. The revenue last year was £36,808 3*s.* 10d., or an increase of £1513 6*s.* 8d. over the revenue of the preceding year; and the expenditure amounted to £34,656 13*s.* 1d., thus showing a profit to the corporation amounting to £2151. I understand that the Gas Committee have for some time had under consideration the propriety of reducing the price of gas this year, but it is very probable that a proposal will be made that the present rate of 5*s.* per 1000 cubic feet should be continued.

It is reported that the question of a reduction in the price of gas has not been overlooked by the Dumfries Gas Company, but that they do not feel themselves warranted in making a change in their charges at present. Last year the Dumfries gas was very considerably reduced in price, long before corresponding reductions were made in other towns. But though no further abatement may be looked for just now, the company will, it is stated, be quite ready to reconsider the question of price should the condition of the coal market and the other costs of production tend to favour the experiment of making the charge still lower than it is at present.

Hitherto the supply of gas to the town of Nairn has been in the hands of a private company, to whom it has yielded a dividend of 7½ per cent. during the last 10 years. Now, however, the capital falls to be increased, and, at a meeting of the company held some days ago, a proposal was submitted to the effect that the gas property should be transferred to a new limited liability company, and that the issue of new stock should be £3500, in £5 shares. The proposal has been agreed to.

The Forfar Corporation gas accounts were submitted to a meeting of that body last Monday evening, but the reports already to hand do not say whether or not any action was taken in reference to them. Certainly the members of that body greatly distinguished themselves by a discussion on the question of continuing the annual dinner, or limiting its expense; but the meeting broke up without any definite resolution being come to on the last-named item. The report of their proceedings has given amusement during the week to almost all the newspaper readers in Scotland.

The estimate of Mr. Brodie, contractor, Greenock, has been accepted by the Gourock Police Commissioners for the enlargement of the reservoir, and construction of the new filter required for the improvement of the water supply. It is £2700, or £1500 less than the highest offer. The work is to be completed within six months.

Within the last week or two the operation of testing the water-mains leading from the Loch of Lintrathen, in connexion with the new water supply works for Dundee, has been in progress. The trials have been eminently successful.

The Kirkwall Commissioners of Police have lately had under consideration a report by Mr. A. C. Hebden, C.E., on the estimates of the scheme prepared by Messrs. Leslie, C.E., Edinburgh, for supplying the town with water. The report stated that a considerable reduction could be made without affecting the full efficiency of the scheme, the reduced estimate being—For reservoir, £2479; for town services, &c., £1683; total reduced cost of constructing water-works for the burgh, £4162; the cost of the works as proposed by Messrs. Leslie being about £6000. Mr. Cursiter stated that the Water Supply Committee had not been able to complete their report in the absence of Lord Zetland's chamberlain, as they could not state with any exactness the price of the grounds on which the works were to be constructed.

On Friday, the 16th inst., the water company of Kilmarnock held their annual meeting. A long report was submitted, and a dividend of 5½ per cent., free of income-tax, was recommended by the directors and accepted by the meeting. The chairman mentioned that Mr. Gale, C.E., Glasgow, was proceeding with the surveys and calculations for the new works, and that he had already been eight days so engaged.

The proposal on the part of the Town Council of Edinburgh to acquire the gas-works of the Edinburgh and Edinburgh and Leith Gas Companies is still a subject of much interest in Edinburgh and Leith. On Monday last a sub-committee of the Lord Provost's Committee appointed to conduct the inquiry remitted to them at the last meeting of the Town Council, held a meeting for the purpose of considering what course of conduct they should adopt. As a preliminary measure, they agreed to open communication with the principal towns and cities whose civic authorities have taken the gas supply into their own hands, with the view of obtaining information on various points, such as the capital of the original gas companies, the dividends paid thereon, the terms on which the works were taken over, and the results, so far as the public are concerned, of the new arrangement. Many questions are suggesting themselves to such of the citizens as are taking a keen interest in the matter. The stocks of both companies are now selling at a higher price than ever they sold at before.

The pig iron trade still remains dull, and there is very little business doing. Prices have ranged during the week between 60*s.* and 60*s.* 6d. cash for warrants, Coltness No. 3 has been reduced in price 1*s.* per ton, but otherwise makers quotations are unchanged.

There is no improvement in the coal trade in the Glasgow market, but a somewhat hopeful report comes from the Fifeshire coal-fields.

SHEFFIELD WATER-WORKS COMPANY.—An extraordinary meeting of shareholders was held on Friday last, when it was resolved to raise the sum of £140,000, the residue of a sum of £500,000 authorized to be raised by the Sheffield Water (New Works) Act, 1867, by the creation and issue of new preference shares.

HUDDERSFIELD WATER SUPPLY.—At the meeting of the Corporation of Huddersfield on the 21st inst., it was resolved that the council do apply to Parliament in the next session for further powers of borrowing money for water-works purposes, and that there be included in the application such further powers in the amendment of the existing Acts relating to the borough or otherwise as may be found advisable.

TAUNTON GAS COMPANY.—At the annual general meeting of the shareholders yesterday the directors reported that the quantity of gas sent out during the past 12 months had been 31,420,900 cubic feet. The new retorts and chimney stack, condensers, scrubbers, and tar-tank are now completed, and it is intended to bring them into use during the coming winter. A dividend of 6 per cent. was recommended and declared, payable on and after the 10th of August next. The directors have reduced the price of gas to the extent of 6d. per 1000 cubic feet, such reduction to take effect from the 15th day of June last.

REDUCTIONS IN THE PRICE OF GAS.—At a meeting of the directors of the Pudsey Gas Company, held at the works on the 13th inst., it was resolved to reduce the price of gas 5d. per 1000 cubic feet, as and from the 1st of July. The Aire and Calder Navigation, who supply nearly the whole of Goole with gas, have just reduced the price from 7*s.* per 1000 feet to 5*s.* 6d. The directors of the Carnforth Gas Company, Limited, in their report submitted to the shareholders yesterday, recommended that the price of gas be reduced from 6*s.* 8d. to 5*s.* 10d. At Taunton there has been a reduction of 6d. per 1000 cubic feet. The Ossett and Horbury Gas Company have announced their intention to reduce the price of gas from the commencement of the present half year to 4*s.* 2d. per 1000 feet, the former price being 4*s.* 7d. The Epsom and Ewell Gas Company have reduced the price of gas 6d. per 1000 from June 30, last.

LEICESTER WATER-WORKS COMPANY.—At an extraordinary meeting of shareholders on the 16th inst., it was resolved—"That in pursuance and under and by virtue of the powers of the Leicester Water-Works Act, 1875, the share capital of this company be, and the same is, hereby increased by the additional sum or amount of £30,000, and that the same be raised by the creation and issue of 1200 shares of £25, to be called new ordinary shares, and that they be offered to the holders of shares in the company on the register of shareholders at the passing of the said Act, in proportion to the several amounts held by them respectively; and that as to so many of such shares in respect whereof any shareholder shall for one month after such offer of new shares fail to accept the same, and pay the first instalment called for in respect thereof, at the time which shall be fixed by the directors, and specified in the letter offering such new shares, the directors be and they are hereby authorized to dispose of the said shares respectively in such manner as they may deem most for the advantage of the company."

CARNFORTH GAS COMPANY, LIMITED.—The report of the directors to the fourth general meeting of shareholders held yesterday states that the balance available for distribution is £564 7*s.* 1d., which enables the directors to propose a dividend at the rate of 8 per cent. on the paid-up capital of the company, and to add £4 7*s.* 1d. to depreciation account. For the year ending June 30, 1874, the profits amounted to £540 14*s.* 6d., and the dividend was at the rate of 7½ per cent. The amount now standing at the credit of the depreciation account is £351 14*s.* 5d., and the directors have not considered it necessary to add a larger sum than the £4 7*s.* 1d. before mentioned for the past year, seeing that a considerable amount has been expended on plant, which has been charged against revenue. The directors consider that owing to the reduced price of coal, and other causes, the price of gas to consumers should be reduced from 6*s.* 8d. to 5*s.* 10d. per 1000, and they propose this reduction taking effect from the 30th of June. They trust that it will have the effect of increasing the consumption of gas, and thus be the cause of no loss to the company.

GALASHIELS GAS COMPANY.—At the 41st annual meeting, held on Tuesday, the 6th inst., the directors report was submitted and unanimously approved. The following extracts show a satisfactory and prosperous state of affairs:—The income for the year ending June last was £8350 12*s.* 7d.; the expenditure and depreciation on works, £6074 10*s.* 9d.; making the year's profits, £2276 1*s.* 10d. This will be appropriated as follows:—Dividend of 10 per cent. to shareholders (as recommended by directors), £1350; added to surplus fund, £426 1*s.* 10d.; balance carried forward to next account, £500. The value of the buildings and works is £16,603 9*s.* 8d.; the share capital, in 1800 shares of £7 10*s.* each, £13,500. The total quantity of gas manufactured was 30,604,600 cubic feet; loss by leakage and condensation fully 7½ per cent., or 2,401,040 cubic feet; gas consumed, 28,203,560 cubic feet; last year the quantity was 23,246,874 cubic feet; increase, 4,956,686 cubic feet. The quantity of coals carbonized was 3025 tons, at an average price of 26*s.* 11d. per ton, yielding 9323½ feet per ton; the illuminating power of the gas was equal to about 30 candles. An 8-inch pipe is being laid along the new road to Gala Park, for the supply of that and other districts at the upper end of the town. The price of gas for the year 1875-76 has been reduced from 5*s.* 5d. to 4*s.* 7d. per 1000 feet.

Register of New Patents.

3269.—SPICE, R. P., Parliament Street, Westminster, "*Improvements in apparatus used in the manufacture of gas.*" Patent dated Sept. 24, 1874.

This invention relates to improvements upon apparatus described in patent No. 4178, Dec. 19, 1873, and consists in the employment of additional apparatus whereby spirit or oil may be used of greater specific gravity than is available by the arrangement described in the former patent, and is intended to be used in combination with the apparatus so described or a part thereof. The additional apparatus which constitute the present improvements consist of a tank or reservoir for containing heavy oil or spirit, or petroleum, whether crude or refined, and connecting the same by means of suitable pipes, cocks, valves, and other appliances with the upper part of each conduit-pipe conveying superheated steam into the retorts.

[This invention was referred to in Mr. Spice's paper on "Water Gas," reported in the JOURNAL for July 6, 1875, vol. xxvi., p. 27.]

3279.—JONES, H. L., Holborn, "*An improved combined flushing and deodorizing and disinfecting apparatus for use in urinals, water-closets, and similar purposes.*" Provisional protection only obtained. Dated Sept. 24, 1874.

The disinfecting apparatus employed is similar to that described in patent No. 2466, July 14, 1874; this is arranged inside a case or box of metal or

other suitable substance divided in the centre, and placed in any convenient position above the urinal. The piston of the glass-lined cylinder, as described in the aforesaid patent, is actuated by means of a balance-rod oscillating on a bar passing through the centre, and at the upper part of the case; one end of this lever or rod is weighted, whilst the other is supplied with a two or more cupped wheel slung and pivoting within the forked arms of the rod at that end, the upper cup, when stationary, resting against a block or projection attached to the side of the case, the object of which is as follows:—The water from the main is supplied by a pipe arranged so that it shall flow into the upper cup; this, as it gradually fills, descends by sliding down the block till it reaches the bottom, when being free it turns over, emptying its contents into the case. The superior weight of the cup (when filled) over the weighted end of the balance-rod causes the latter to rise, lifting with it the piston, and thus allows the disinfectant fluid to enter below the piston, and when the cup discharges its contents the weight rapidly descending presses down the piston, and forces the fluid to ascend the pipe connected to the piston cylinder, thence to empty its contents into the water in the case or box, the other cup at the same time occupying the place of the first. Thus by the alternate see-saw motion of the cups at one end of the balance-rod and the weight at the other (produced by the flow of the water from the main into the cups), an intermittent and simultaneous flushing and disinfecting process is sustained at intervals, in accordance with the flow or force of water from the main, which is regulated by a tap. The communication between the apparatus and the usual flushing-tubes of the urinal is effected by its junction thereto by a small pipe.

3287.—Furness, G., Heaton Norris, Lancs, "*Improvements in the construction of cocks and valves for controlling the flow of liquids and fluids.*" Patent dated Sept. 25, 1874.

The features of novelty in this invention as applied to plug cocks consist in forming a jacket or space surrounding the plug, and as applied to valves actuated by a screwed spindle in forming the spindle separate from the screw, and with an inverted valve working against a valve-seating, whereby a stuffing-box is dispensed with.

3318.—Wallace, J., Newcastle-on-Tyne, "*Improvements in gas-burners and in apparatus connected therewith.*" Patent dated Sept. 28, 1874.

For gassing yarns and other purposes a burner-tube adapted to produce a small flat flame is employed, flattened at the upper part, and so cut and shaped that the flame shall issue from the side of the top in such a manner that no dust or other particles falling from above may enter the opening from which the gas issues. A ventilator consisting of an inverted cup or vessel, suspended over the flame, and having an orifice in its upper part, may be adjusted to carry off the products of combustion by means of a draught of air. The cup is attached to an air-tube having a hole to correspond, and the opening through may be varied at will according to the amount of products of combustion.

In atmospheric or Bunsen burners, to effect a better admixture of the gas with the air induced by it previous to combustion, an arrangement is employed consisting of one or more diaphragms of sheet metal, wire gauze, or other material placed inside the burner-tube, dividing its area into two or more compartments. The friction of the sides of which has the effect of more intimately mixing the gas and air passing between them. Cross bars or twisted or bent wire may be arranged in the burner with the same object.

For compound or multiple burners of the class specified in patents No. 634, Feb. 29, 1872, and No. 1999, July 2, 1872, in which wire gauze is used to prevent striking back, the burner-tube is made of increased diameter at the bottom, so that the wire gauze may be placed close against the bottom of the tube without reducing the necessary area for the passage of the gas.

3340.—Forbes, Rev. G. H., Broughton Rectory, Northampton, "*Improvements in the manufacture of cement.*" Provisional protection only obtained. Dated Sept. 30, 1874.

According to the present invention the foul or refuse lime of gas-works, and coke or coke breeze, or an equivalent of the same, is used without chalk or limestone in the manufacture of cement, and from one-third part to six parts of coke or coke breeze, or an equivalent of the same, is employed to one part of foul lime.

3345.—Westwood, W. H., Wright, E., and Wright, E. T., Dudley, "*Improvements in stop or regulating valves for regulating or controlling the passage of liquids and gases through pipes or tubes, and for other like purposes.*" Patent dated Sept. 30, 1874.

This invention refers to those kinds of valves in which a valve in the form of a disc is employed, and consists in so constructing the valve-box that the valve and its gearing may be readily removed and replaced, and cleaned and lubricated; also in mechanism for opening and closing the disc valve.

The gearing for working the valve is situated and works in a gear chamber at the top of the valve-box, the said chamber being covered by a plate or cover, or by the gland of the stuffing-box of the gearing. By lifting the cover, the gearing may be removed, cleaned, or lubricated. The valve-box is also furnished with an opening for facilitating the removal and replacement of the valve and parts thereof, and for cleaning and lubricating the valve. The valve is worked by spur or bevel gearing, or by the direct action of a spindle or shaft passing to the outside of the valve-box, and being worked by a lever or by gearing.

3352.—Lynde, J. H., Sale, Cheshire, "*An improved apparatus for saving water in water-closets, urinals, and other places, where a fixed quantity of water is required at each operation.*" Patent dated Oct. 1, 1874.

This apparatus consists of a cistern divided into two or more compartments, but connected by holes at the bottom of the partitions; in one compartment is a ball-valve, and the others are provided with syphons and flaps connected to a handle, by which the water is drawn off as required.

3404.—Trotter, H., North Shields, "*An improved self-lighting and extinguishing apparatus.*" Patent dated Oct. 6, 1874.

The main object of this invention is to ensure the lighting and extinguishing of all the public gas-lamps simultaneously; to which end a spring, attached to the cock of the burner, is kept in resilition until the sand from a reservoir above has run into a receiver balanced on the arm of a lever, the other arm being graduated, and having a shifting balance-weight to regulate the time when the lever shall be overbalanced by the weight of the sand in the receiver; the turning of the fulcrum sets the spring at liberty, thereby turning on the gas. Similar means are employed to extinguish the light. When the cock is turned on, it sets at liberty another spring, which carries with it two matches fixed to the end, striking them smartly along a roughened surface, so adapted as to yield slightly to the pressure of the matches. The matches having become ignited, are, by means of a guide, brought in close proximity to the burner.

3439.—Huggett, J. A., Clapham, Surrey, "*Improvements in ball-valves.*" Provisional protection only obtained. Dated Oct. 7, 1874.

According to these improvements a cupped leather is employed in the ball-valve. The water is delivered through slits in the side of a tube, within which is the cupped leather, which can be made to cover the slits for the purpose of stopping the flow.

3464.—Parkes, S. H., Birmingham, "*Improvements in gas and other lamps.*" Patent dated Oct. 9, 1874.

This invention has for its objects to correct the colour of the light emitted by gas and other lamps, so as to make it approximate to a pure white light, as well as to absorb the heat evolved, and charging the atmosphere in which they are burning with such an amount of vapour of water as will correct the parched character of the air in the room.

APPLICATIONS FOR LETTERS PATENT.

2557.—Grauhan, F. W., Bradford, "Improvements in apparatus employed in the filtration of water, sewage, and other fluids." July 17, 1875.
2572.—Sagar-Musgrave, J. M., Akeroyd, J. B., and Ward, D., Leeds, "Improvements in pump buckets and valves for the same." July 19, 1875.
2594.—Macnell, J., South Kensington, London, "Improvements in water-meters." July 21, 1875.
2604.—Birrell, W., Lanark, "A new or improved apparatus for regulating the pressure or production of gases and liquids." July 21, 1875.
2605.—Johnson, J. H., Lincoln's Inn Fields, London, "Improvements in blowers or apparatus for compressing or forcing fluids." A communication. July 21, 1875.
2610.—Warner, W. J., South Shields, "Improvements in machinery and apparatus for charging and discharging gas-retorts." July 22, 1875.

GRANTS OF PROVISIONAL PROTECTION.

2463.—Higginson, A., Liverpool, "Improvements in engines and pumps." July 8, 1875.
2464.—Carlyon, P., Denmark Hill, Surrey, and Titterton, F., Cloudesley Street, London, "Improvements in tools or apparatus for expanding tubes." July 8, 1875.
2473.—White, W., Abersychan, near Pontypool, Mon., "Improvements in apparatus used in the manufacture of gas." July 9, 1875.
2492.—King, T., Oldbury, Worcester, "Improvements in direct-acting steam-pumps." July 10, 1875.
2523.—Newton, H. E., Chancery Lane, London, "Improvements in apparatus applicable to burners for lighting purposes." A communication. July 13, 1875.
2545.—Wilson, M., Brixton, London, "An improved stench-trap." July 15, 1875.

NOTICES TO PROCEED.

838.—Humphries, J. R., Middlesborough-on-Tees, "Improved apparatus for preparing the joints of leaden and other soft metal pipes." March 6, 1875.
2320.—Boulton, M. P. W., Oxford, and Imray, J., Southampton Buildings, London, "Improvements in helical pumps." June 25, 1875.
2334.—Smyth, W. W., Maidstone, Kent, and Hunt, G. G., New Cross, London, "Improvements in gas-engines." June 26, 1875.
2499.—Patrick, R., Canada, "Improvements in rotary pumps and engines." July 12, 1875.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

265.—Mills, E. C., and Haley, H., Gorton, Lancs, "Improvements applicable to motive-power engines, worked by the explosion of gas." Jan. 23, 1875.
269.—Allen, W., Manchester, "Improvements in machinery for raising and forcing fluids and liquids." Jan. 23, 1875.
1857.—Tylor, A., Newgate Street, London, "Improvements in apparatus and arrangements for controlling, arresting, measuring, and recording the flow of liquids and fluids, and preventing the escape and waste of the same." May 20, 1875.
1948.—Copp, W. L., and White, C., Watchet, Somerset, "Improvements in apparatus for the manufacture of gas." May 27, 1875.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1945.—Millward, J., "Improvements in hydrants for supplying fire-engines from street-mains." June 27, 1872.
1953.—Giroud, H., "A new and improved rheometric regulator for gas-burners." June 28, 1872.
1956.—Phillips, T. H., "Improved apparatus or appliances applicable fo heating, cooking, and lighting purposes." June 28, 1872.
1990.—King, H. J. H., "Improvements in apparatus for obtaining motive power for pumping or for measuring fluids." July 2, 1872.
1999.—Wallace, J., "Improvements in gas-stoves and burners, and regulating apparatus to be used in connexion therewith." July 2, 1872.
2036.—Caillot, E. J. L., "Improvements in the manufacture of lighting and heating gas, and in apparatus and burners connected therewith." July 5, 1872.
2090.—Chandler, J., "Improvements in apparatus for the control of water and preventing waste thereof." July 11, 1872.
2101.—Bennett, W. H., "Improvements in apparatus for lighting and extinguishing public and other gas lamps or lights." July 12, 1872.
2141.—Copland, H. S., "Improved apparatus for mixing precipitating materials with sewage, and removing deposits, which apparatus is applicable also for other purposes." July 17, 1872.

D. BRUCE PEEBLES & CO.,
ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF WET AND DRY GAS-METERS;
Patentees and Sole Manufacturers of PEEBLES' LAMP-GOVERNORS,
ABOVE 30,000 OF WHICH ARE NOW IN USE.
"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S., F.C.S.*
D. BRUCE PEEBLES AND CO., FOUNTAINBRIDGE WORKS, EDINBURGH.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

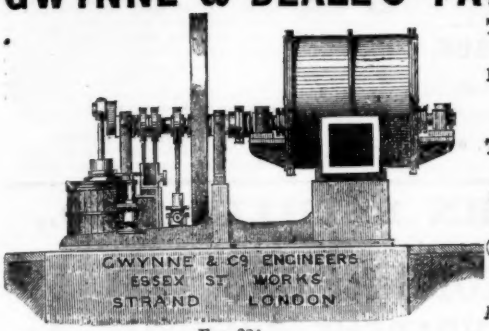


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

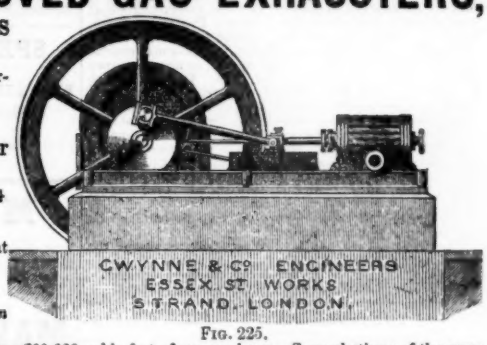


FIG. 225.

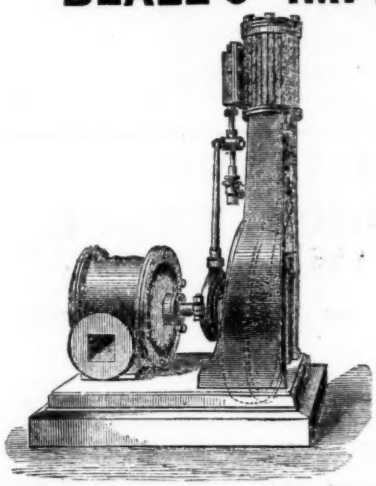
Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,
CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

BEALE'S IMPROVED PATENT GAS-EXHAUSTER



WITH

ENGINE COMBINED

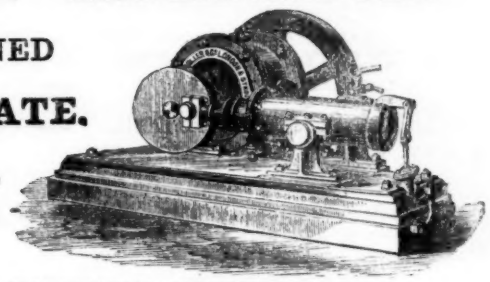
ON

ONE BASE PLATE.

SOLE MAKERS,

GEORGE WALLER & CO.,

Who, since Mr. BEALE'S retirement, are the Oldest Makers.



EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
MAKERS of ENGINES, BOILERS, and GAS MACHINERY.
TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever.
MANN'S and many other descriptions of WATER DISTRIBUTORS.
SCRUBBERS, PURIFIERS, and CONDENSERS.
EXHAUSTERS from 3000 to 60,000, new and second hand, in stock.

PHŒNIX ENGINEERING WORKS, HOLLAND STREET, S.E., & at STROUD, GLOUCESTERSHIRE.

WANTED, a Youth, about 18 or 19 years of age, with some experience at Gas-Works, as UNDER-FOREMAN for the San Paulo Gas Company's Works, in Brazil.

Apply to the SECRETARY, Pinner's Hall, GREAT WINCHESTER STREET, E.C., by letter with testimonials.

WANTED, by the son of a Gas Engineer, the MANAGEMENT of a Gas-Work, where a stoker is kept in the summer time, or Assistant Manager of a larger work, and to take the out-door superintendence, the reading of meter indices, and collection of accounts, &c.

Address No. 179, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, in a Gas Engineer's Office, a young Man as ASSISTANT DRAUGHTSMAN; son of a Gas Manager preferred.

Address, stating age, where last employed, and salary required, to No. 183, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS-WORK MANAGERS

WANTED, an Engineer to proceed to India, to take the management of an oil Gas-Work for the Indian Government, where there are about 3000 lights. Salary £250 a year for three or five years, with free quarters. A single man preferred.

Apply, in own handwriting, enclosing testimonials and references, to GEO. BOWER, St. Neot's, HUNTS.

R. ANDREWS, Retort-Setter. Estimates given for Setting Brick, Iron, and Clay Retorts, and Gas Ovens, Repairs, &c.

Address No. 4, Broomfield Cottages, Bowes Road, Southgate, LONDON, N.

NEW EDITION, NOW READY.

ADVANTAGES OF GAS FOR

COOKING AND HEATING.

By MAGNUS OHREN, A.I.C.E., F.C.S.

For Companies to issue to their Gas Consumers.

Specimen Copy by post Threepence, direct from MAGNUS OHREN, Gas-Works Lower Sydenham, London, S.E.

SOUTH SHIELDS GAS COMPANY.

CLERK of the Works wanted. State age, experience, references, and salary required, to W. J. WARNER, Engineer.

FOR SALE—A 4-horse Engine and Exhauster, to pass 10,000 cubic feet per hour. Self-acting bye-pass and two gas-valves, 8-in. connexions and exhauster governor.

For further particulars, or to view the same now working, apply at the GAS-WORKS, WALTON-ON-THAMES.

FOR SALE, very cheap, first-class Gasholder, 30 ft. by 10 ft., complete. Can be seen working near London.

For particulars, apply to H. SKOINES, Contractor for Gas, Water, and Public Works, 7, Argyle Street, King's Cross, LONDON, W.C.

THE Scarborough Gas Company have FOR SALE, in consequence of removing to their New Works, a first-class Telescope GASHOLDER, 52 ft. in diameter and 44 ft. deep. It was made and erected by C. and W. Walker, of Donnington, in 1868, and is in excellent condition. It is of remarkably good workmanship, being perfectly circular and true, and free from all irregularities. The columns and girders are of handsome design and highest class of work.

Gas Companies wanting a good Gasholder this year will find this an advantageous opportunity.

For further particulars apply to

JAMES MOON, Gas Engineer, Scarborough.

TENDERS FOR COAL.

THE Carlisle Gas Committee are prepared to receive TENDERS for the supply of from 7000 to 10,000 tons of best screened GAS COAL. Deliveries to extend, as may be directed, from August, 1875, to March or June, 1876.

The Coals are to be the best of their kind, and free from sulphur, bats, bind, refuse, and dirt, and must be delivered free at any of the railway stations in Carlisle.

Payments will be made monthly, if, and so long as, the contract shall be duly fulfilled.

Sealed tenders, specifying the description of Coals and the pits at which they are to be raised, must be endorsed "Tender for Coals," and delivered on or before the 3rd day of August, 1875.

J. HEPWORTH, Manager.

Gas-Works, Carlisle, July 14, 1875.

AMMONIACAL LIQUOR.

THE Directors of the Runcorn Gas Company invite TENDERS for the AMMONIACAL LIQUOR produced at their works, for a term of Three years from the 5th of August, 1875.

Particulars may be obtained from the undersigned, to whom tenders must be sent, endorsed "Tender for Ammoniacal Liquor," not later than the 3rd of August next.

J. R. FRITH, Secretary and Manager.

Gas-Works, Runcorn, July 22, 1875.

THE Directors of the Horsham Gas Company invite TENDERS for their surplus TAR, from Aug. 15, 1875, to Aug. 15, 1876.

The quantity is expected to be about 10,000 gallons.

The purchaser to take the Tar when required in quantities of about 20 barrels, to find his own barrels, and to pay railway carriage.

The Company to convey the Tar to the railway station.

Sealed tenders, stating price per gallon, and endorsed "Tender for Tar," to be sent in on or before Monday, Aug. 9, to R. SHEPPARD, Secretary.

THE St. Day Fire-Brick and China Clay Company, Limited, having largely increased their works, are now prepared to TENDER in any quantity for the supply of their well-known BRICKS and other FIRE GOODS, either for the Home trade or exportation. Prices and samples will be forwarded on application to the works, St. Day, CORNWALL, or the London Offices, 7, St. Bene't Place, GRACECHURCH STREET.

BOVEY TRACEY.

TENDERS are invited for the erection of new GAS-WORKS, accompanied by plans and specifications, to be delivered on or before the 14th of August, addressed to Mr. R. DAY, Union Hotel, Bovey Tracey, from whom any information can be obtained. No charges for plans, &c., will be recognized, and those not accepted will be returned free.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS ALLAN & SONS, of Springbank Iron-Works, Glasgow, manufacture small cast-iron GAS AND WATER PIPES, 1½ to 6 inches, at their branch works, Stockton-on-Tees, and have at present a large stock, which they are open to sell at moderate prices.

TO COLLIERY OWNERS, &c.

THE Directors of the Barnsley Gas Company hereby invite TENDERS from parties willing to contract to supply and deliver into the retort-houses, at their works, situated at Old Mill and Pontefract Road, Barnsley, respectively, all the screened soft COAL, of the best quality, suitable for gas-making, that they may require for a period of One, Two, or Three years, as may be agreed upon, from the 1st day of October, 1875. The said Coal to be delivered in a dry condition, free from smudge, dirt, shale, pyrites, or other impurities, at either of the said works, in such quantities and at such times as the Manager may direct. There are railway sidings into both works.

Sealed tenders, stating respectively the price of coal delivered as above, endorsed "Tender for Coal," and addressed to the Chairman, must be left at the Gas Company's Office, on or before Thursday, the 5th day of August next.

Any further information required may be obtained on application to the undersigned.

The Directors do not bind themselves to accept the lowest or any tender.

By order,
JOHN HUTCHINSON, Manager.

Gas Offices, Pontefract Road, Barnsley, July 22, 1875.

THETFORD WATER-WORKS.

TO CONTRACTORS.

THE Town Council of the Borough of Thetford, in the counties of Norfolk and Suffolk, are desirous of receiving TENDERS for the construction of a RESERVOIR, the sinking of an Artesian Well, the erection of Engine and Boiler House, &c., together with the laying of Water-Mains, Hydrants, &c.

The whole of the work to be in one contract.

The drawings and specifications can be seen, and quantities and forms of tender can be obtained, at the Offices of Messrs. Jabez Church and Son, 17B, Great George Street, Westminster, Civil Engineers. Copies of the drawings and specifications can also be seen at my Office.

Tenders, sealed and endorsed "Tender for Thetford Water-Works," must be delivered here on or before the 7th day of August next.

The Council do not bind themselves to accept the lowest or any tender.

By order,
JOHN HOUCHEN, Town-Clerk.

Town-Clerk's Office, Thetford, July 17, 1875.

Will shortly be ready, price 18s., bound in cloth, lettered,

THE TWENTY-FIFTH VOLUME

(JANUARY TO JUNE, 1875)
OF THE

JOURNAL OF GAS LIGHTING, WATER SUPPLY, AND SANITARY IMPROVEMENT.

CLOTH CASES, GILT LETTERED,
For binding Vol. XXV., may now be obtained,
Price 2s. 6d.

TERMS OF SUBSCRIPTION.

The JOURNAL OF GAS LIGHTING is supplied direct from the Office to residents, in any part of the United Kingdom, at the rate of 21s. per annum, payable in advance. If credit be taken, the charge is 25s.

Halfpenny stamps may be forwarded for amounts under 5s. Any larger sum should be remitted by Money Order, payable at the General Post Office, to William B. King.

CHARGES FOR ADVERTISEMENTS.

Six lines (about 40 words) or under . . . £0 3 0
Each additional line (about 8 words) . . 0 0 6
Special Terms for Continuous Advertisers.

The insertion of Advertisements in the current week's issue cannot be guaranteed unless received at the Office by THREE o'clock p.m. on MONDAY.

The Publisher cannot be responsible for Testimonials, accompanying replies to Advertisements, left at the Office, and strongly recommends that *copies only* should be sent.

LONDON:
WILLIAM B. KING, 11, BOLT COURT, FLEET STREET, E.C.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

South Shields. W. J. WARNER.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine: (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

J. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

WOLSTON'S TORBAY IRON PAINTS.

THE Torbay and Dart Paint Company, Limited, 23, Great George Street, Westminster, S.W., having been informed that PAINTS not manufactured by them are being offered to Gas Companies and the public as "WOLSTON'S," hereby give notice that they will TAKE PROCEEDINGS against any persons infringing their rights as sole proprietors and manufacturers of Wolston's Torbay Iron Paints.

(See Advertisement on another page.

PARTIES desirous of tendering for the furnishing and erection of a GASHOLDER, to communicate with H. AND F. BAILEY, Gas Engineers, East Retford, NOTTS.

SPENT OXIDE OF IRON.

We are open to
BUY EITHER LARGE OR SMALL PARCELS.
State quantity and price, put free on rails, or delivered here to
JOHN NICHOLSON & SONS, CHEMICAL WORKS, HUNSLET, LEEDS.

IN THE MATTER OF BRONNER'S PATENT BURNERS.

NOTICE is Hereby Given that Julius Brönner, on the 20th of April, 1875, in a suit in Chancery, 1874, B 365, obtained an injunction perpetually restraining the Defendant, his Agents, Servants, and Workmen, from in any way advertising or offering for sale, or selling, or from in any manner causing to be advertised, or offered for sale, or sold as "Real Brönner," or "Brönner," or "Broehner" Burners, any Burner not manufactured by or for the Plaintiff, Julius Brönner, or by his Agents.

JACKSON, FOX, AND ELLEN,
55, Chancery Lane, London,
Solicitors for the Plaintiff,
JULIUS BRÖNNER, Frankfort-on-Maine.

MESSRS. JOHN BETHELL & CO.,

(ESTABLISHED 1836,)

CONTRACTORS for GAS TAR,

MAKERS OF ANTHRACENE, CREOSOTE, &c.,

CLAYTON CHEMICAL WORKS, MANCHESTER;
SWAN VILLAGE, WEST BROMWICH.

Head Offices: 38, KING WILLIAM STREET, LONDON BRIDGE.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

ALFRED WILLIAMS,

PHŒNIX FIRE-BRICK WHARF,

64, BANKSIDE, SOUTHWARK, LONDON, S.E.

GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

B. GIBBONS, JUN.,

DIBDALE FIRE-CLAY, BRICK, AND GAS-RETORT WORKS,

STOURBRIDGE (Established 1834),

MANUFACTURER OF EVERY DESCRIPTION OF

Burs, Lumps, Stays, Shields & other Bricks, & Gas-Retorts.

A LARGE QUANTITY OF RETORTS ALWAYS IN STOCK.

Circular . 14 in., 15 in., 16 in., 18 in.
Ovals . . 17 in. × 14 in., 17 in. × 15 in., 20 in. × 15 in., 21 in. × 15 in., &c.
D's. . . { 14 in. × 14 in., 15 in. × 12 in., 15 in. × 13 in., 17 in. × 14 in., 18 in. × 13 in.
{ 18 in. × 15 in., 20 in. × 16 in., 22 in. × 14 in., 24 in. × 14 in., 24 in. × 15 in., &c.

Special attention given to the execution of Export Orders.

LIME SUPERSEDED

IN THE

PURIFICATION OF ILLUMINATING GAS

BY

SPENCE'S PATENT DRY COPPERAS.

The only purifying material which removes by one process, without injury to the purifiers, all Ammonia and Sulphuretted Hydrogen. It has been in use for upwards of five years at some of the largest Gas-Works in the Kingdom.

TESTIMONIALS SENT ON APPLICATION TO

SPENCE BROTHERS CHEMICAL COMPANY, LIMITED,
VICTORIA CHEMICAL WORKS, BRADFORD, MANCHESTER;

SOLE MANUFACTURERS OF SPENCE'S PATENT DRY COPPERAS,
SPENCE'S PATENT GAS DEODORIZER, AND MUDIE'S DISINFECTANT;
MANUFACTURERS OF
SULPHATE OF AMMONIA, VITRIOL, COPPERAS, &c.;
PURCHASERS OF SPENT OXIDE AND AMMONIACAL LIQUOR, AND CONTRACTORS FOR THE PURIFICATION OF COAL GAS.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.

1862 LONDINI HONORIS CAUSA

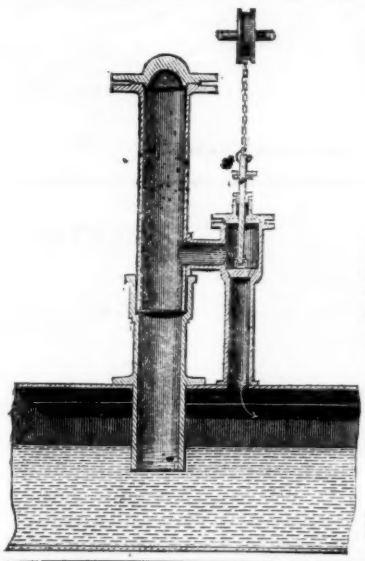
This Paint having been in general use over thirteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.



COPP'S PATENT GAS APPARATUS

For the Removal of all Pressure caused by the Hydraulic Seal;

THE EFFECTS PRODUCED BEING

1.—A LARGE INCREASE IN THE YIELD OF GAS.

2.—AN ENTIRE PREVENTION OF THE DEPOSIT OF CARBON.

3.—THE ASCENSION-PIPES DO NOT CHOKE.

The apparatus is very simple in construction, and cannot get out of order, and being an outside addition to the present arrangement of works, can be applied so easily as to require no alteration of plant. It may be fitted whilst the retorts are in use, without interfering with the manufacture of gas. The cost is so small that the outlay will be repaid in a few weeks' working. For further particulars apply to the Patentee,

W. L. COPP, WATCHET GAS-WORKS, SOMERSET,

or, 232, BRIXTON ROAD, LONDON, S.W.

The following is the opinion of JAMES PATERSON, Esq., President of the British Association of Gas Managers:—

WARRINGTON, *July* 12, 1875.

DEAR SIR,—I am obliged by your drawings, and cannot but say to you that I entertain a favourable opinion of your patent arrangements for the removal of the hydraulic seal when the retorts are in operation. It appears to be amongst the best, and probably the best, of the various devices in use for that purpose.

Mr. W. L. COPP. Yours truly, JAMES PATERSON.

THE

PATENT "UNIVERSAL" STEAM PUMP

WAS AWARDED, AT THE

VIENNA EXHIBITION, 1873,

THE GRAND PRIZE "MEDAL OF PROGRESS."

AT LILLE—GOLD MEDAL - - - - 1874. AT MANCHESTER—SILVER MEDAL - 1874.

OPINIONS OF THE PRESS.

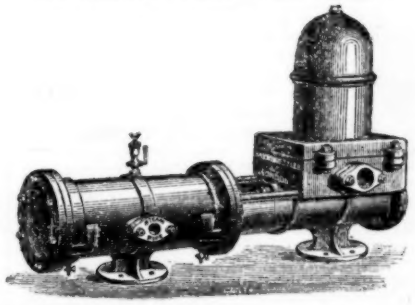
"The simplest machine of its kind."—*Engineering.*

"Remarkable for its simplicity and ease of action."—*Daily Telegraph.*

"None that we have noticed work so quietly."—*The Engineer.*

"Nothing invented in hydraulic steam power half so cheap and effectual."—*Griffith's Iron Trade Exchange.*

NO TAPPET VALVES OR GEAR.



IN USE IN SOME OF

THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,

FOR

TAR AND AMMONIACAL LIQUORS.

ONE SELECTED FROM AMONGST MANY TESTIMONIALS RECEIVED BY H. T. & CO.:—

"*Ardwick Bridge Chemical Works, Manchester, Oct.* 28, 1872.

"Sir,—The 'Universal' Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.

"Yours truly,

(Signed) "PETER HART, *Manager.*"

SOLE MAKERS,

HAYWARD TYLER & CO.,

84 and 85, UPPER WHITECROSS STREET, LONDON, E.C.

D. A. GRAHAM,

CONSULTING GAS ENGINEER,

STALYBRIDGE, NEAR MANCHESTER,

Erects Horizontal Condensers, Retort Settings, Pumps, Self-Acting Exhauster Governors, Coal-Testing Apparatus, &c., &c.

Gas-Works surveyed, mapped, and reported on, and extensions or alterations designed and the particulars specified, and work estimated for and executed.

D. M. NELSON,

48, GORDON STREET (late 135, BUCHANAN ST.),

GLASGOW,

Supplies every requisite in connexion with the distribution of Gas and Water.

Estimates and prices on application.

WOOD GRIDS for Purifiers and Scrubbers.

Cast-iron PIPES and VALVES.

Street LAMP-PILLARS.

Patent Pipe SCREWING-MACHINES, &c.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

WM. RICHARDS,

INVENTOR OF THE DRY GAS-METER,

REVISER OF "HUGHES ON GAS-WORKS,"

CONSULTING GAS ENGINEER,

Advises on all matters of business connected with Gas Lighting. Furnishes Working Drawings of Retort-Settings, Specification of Works, complete or in detail.

11, ST. MICHAEL'S ROAD, STOCKWELL, LONDON, S.W.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

PATENT FUEL AND LIME FOR PURIFYING FROM FOUL LIME.

By a simple process the Foul Lime is converted into Fuel, by the combustion of which the lime is reproduced as a purifying agent.

Licences to work the invention will be granted to Gas Companies on very reasonable terms.

For further particulars apply to Mr. E. MADDOCKS, Manager of the Gas-Works, KETTERING.

The adoption of the above invention, without a licence from the Patentee, will be an infringement of the patent, and will subject the person or company guilty of such infringement to legal process.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

INTERNATIONAL EXHIBITION, 1862.

CLASS X.

PRIZE MEDAL

For excellence of Fire-Clay Gas Retorts, and

"HONOURABLE MENTION" for good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,

THROCKLEY,

NEWCASTLE-ON-TYNE.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Keep in London and at their works large stocks of PIPES and CONNEXIONS (1¼ to 36 inches in diameter); also make and supply Retorts, Tanks, Columns, Girders, Special Castings required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

CHARLES HORSLEY, Agent.

C. & W. WALKER'S WOOD PURIFIER SIEVES,

Which have now been used for twelve years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

8, FINSBURY CIRCUS, LONDON.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.

A LARGE STOCK ALWAYS IN HAND OF

IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,

AND EVERY DESCRIPTION OF

GAS AND WATER FITTINGS.

THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.

STREET LAMPS AND COLUMNS IN GREAT VARIETY.

WORKS: LONDON AND BIRMINGHAM.

GAS MOONS, Cut and Engraved, of the newest designs

GAS REFLECTORS In Silver and Glass

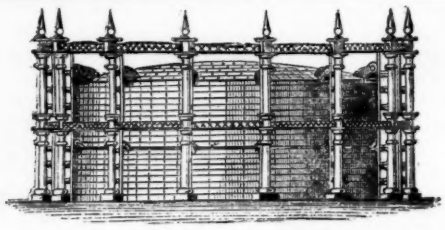
GAS NIBS AND **BURNERS** Of every description.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1875, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.

HOPE IRON WORKS,



STOCKTON ON TEES.

ASHMORE & WHILE,

GAS ENGINEERS & CONTRACTORS,

MANUFACTURERS OF GASHOLDERS,

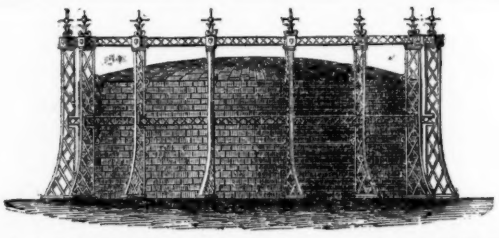
GAS APPARATUS OF EVERY DESCRIPTION,

Including Improved

Retort-Lids, Boilers, Cast and Wrought Iron Tanks, Iron Roofing, Bridges, Girders,

And GENERAL IRONWORK.

N.B.—Estimates for all Gas Plant and Remodelling supplied on application.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

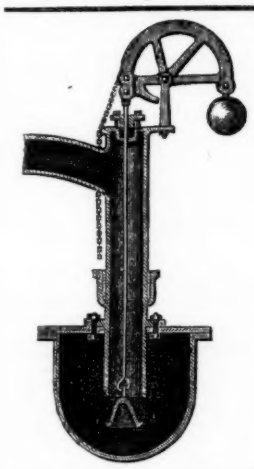
2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.



BOX'S
PATENT ANTI-DIP VALVE

Affords a clear gas way through the dip-pipe while the retort is in action, and produces a perfect seal at pleasure, or whenever the retort is open, offering great security against the drawing of air, and obviating the necessity for using any liquid in the now so-called hydraulic main. It is easy of application to existing apparatus, and is comparatively inexpensive. Is not likely to get out of order, as the tar, which will adhere to the botton of the dip-pipe and the flange of the cone, both of which are faced, will act as a lubricant, and prevent undue wear and tear. The whole, as will be seen on inspecting the accompanying illustration, is exceedingly simple, and every part accessible. To adapt it to the present dips, all that is necessary is to face the bottom edge of the dip-pipe, and suspend a cone by a rod, which passes through the bonnet, the raising and lowering of the cone being performed through the intervention of a weighted eccentric.

The Patentee is prepared to supply Patented Apparatus upon the most moderate terms, and will be happy to reply to any inquiries that may by adddressed as under—

W. BOX,

GAS-WORKS, CRAYFORD, KENT

KÖRTING BROTHERS,

SOLE LICENSEES FOR

W. CLELAND'S PATENT STEAM-JET GAS-EXHAUSTER.

E. KÖRTING'S PATENT STEAM-JET GAS-EXHAUSTER.

Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—Smallest Boiler Pressure Sufficient—No Steam-Engine—No Gearing—No Attention—No Extra Room Required—No Tear and Wear—No Noise—No Oscillation in Vacuum, or Back Pressure.

UPWARDS of 150 in USE in CONTINENTAL GAS-WORKS.

IN ENGLAND SUPPLIED TO—

Chartered Gas Co., London.
London Gaslight Co., London.
South Metropolitan Gas Co., London.
Phœnix Gaslight and Coke Co., London.
Liverpool United Gaslight Co., Linacre.
Corporation Gas-Works, Bolton.
Cornholme District Gas-Works, near Todmorden.

These Gas-Exhausters are kept in stock in 16 different sizes, delivering from 500 cubic feet to 60,000 cubic feet of Gas per Hour.

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS

For the Purifying Material are kept in Stock in three different Sizes. Upwards of 100 in use.

IN ENGLAND SUPPLIED TO—

Phœnix Gas Co., South Metropolitan Gas Co., Chartered Gas Co., London Gaslight Co., Independent Gas Co., in London.
Gas-Works, Brentford, Middlesex.

We beg to inform Gas Engineers that we are Licensees for

W. CLELAND'S PATENT STEAM GAS-SCRUBBER,

Combining small cost and thorough efficiency with absence of any mechanical means and necessity of renewing the scrubbing material.

For particulars apply to **KÖRTING BROTHERS,**

STEAM-JET ENGINEERS, 7, LANCASTER AVENUE, MANCHESTER.

GEBR. KÖRTING, HANNOVER, GERMANY.

SCHUTTE AND GOEHRING, 222, WALNUT STREET, PHILADELPHIA, U.S.

KÖRTING BROTHERS,

STEAM-JET GAS-EXHAUSTERS AND REVIVIFYING BLOWERS FOR OXIDE.

LONDON AGENT AND AGENT FOR SOUTH OF ENGLAND:

GERALD J. TUPP, 8, John Street, Adelphi, W.C.,

To whom all inquiries for these districts should be addressed.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

SCOTSWOOD-ON-TYNE.

THOMAS LAMBERT & SONS

MANUFACTURE EVERY DESCRIPTION OF

GAS AND WATER FITTINGS;

ALSO,

WROUGHT-IRON TUBES & FITTINGS.

SHORT STREET, LAMBETH, LONDON

MOBBERLEY & PERRY,

THE HURST

FIRE CLAY and BRICK WORKS,

STOURBRIDGE.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAY.

Manufacturers for Home and Export.

GAS-RETORTS, GLASS-HOUSE FURNACE, BLAST-FURNACE, & TANK BRICKS, LUMPS, TILES,

And Every Description of Best Fire-Bricks.

"SELLARS' CEMENT"

PREVENTS WASTE OF GAS FROM RETORTS;

SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;

GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;

And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.

J. C. SELLARS,

THE GAS CEMENT WORKS,

BIRKENHEAD.

B. CARPENTER,

THE ORIGINAL MANUFACTURER OF

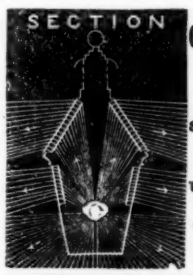
WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

WORKS:

22, HERMES STREET, PENTONVILLE ROAD, LONDON, N.



THE PATENT

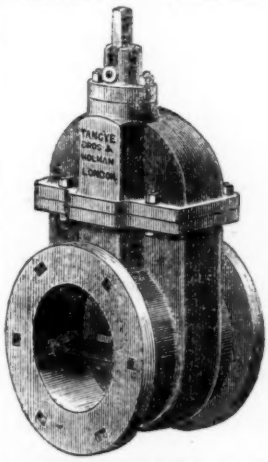
CATOPTRIC LAMP

Is now in use in Moorgate Street, Cheapside, and Trafalgar Square, and has been in successful operation upon Waterloo Bridge since Oct. 7, 1871.

T. A. SKELTON, 37, Essex St., Strand, LONDON, INVENTOR AND PATENTEE.

IMPROVED

GAS-VALVES,



AT GREATLY

REDUCED

PRICES.

Inch.	s.	d
2½	24	0
3	27	0
4	36	0
5	45	0
6	54	0
7	63	0
8	80	0
9	90	0
10	100	0
12	135	0
14	180	0

TANGYE BROS. & HOLMAN,

LAURENCE POUNTNEY LANE,

LONDON.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:
DARTMOUTH AND BRIXHAM, DEVON.

OFFICES:
23, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF
WOLSTON'S CELEBRATED
TORBAY IRON PAINTS.
(ESTABLISHED 1851.)

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Waggon Works, and the Paint Trade generally. They are the BEST PROTECTORS of IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to ironwork. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only before use to be thinned down in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

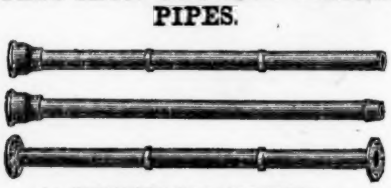
PRICES and TESTIMONIALS on APPLICATION.
(See Notice on another page.)

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of
CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

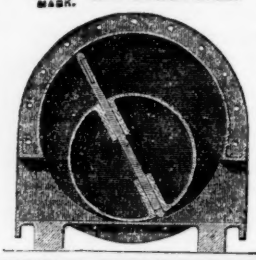
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
18 & 20, ALSTON STREET, GLASGOW.
CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B. ON CLYDE.
Prices on application.

TRADE MARK
J. BEALE'S PATENT GAS EXHAUSTER.



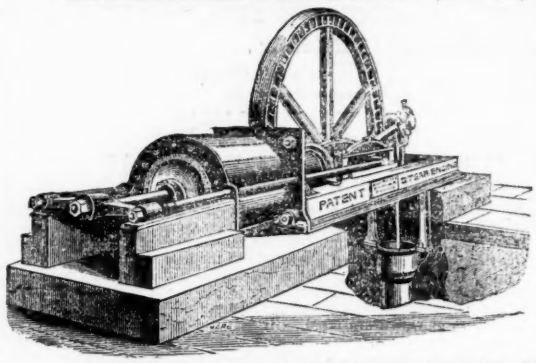
BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.

Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
BERMONDSEY, LONDON, S.E.

ECONOMY OF FUEL IN STEAM-ENGINES.
B. DONKIN & CO.,
PATENT HORIZONTAL COMPOUND CONDENSING
STEAM-ENGINES,
APPLICABLE FOR DRIVING GAS-EXHAUSTERS.

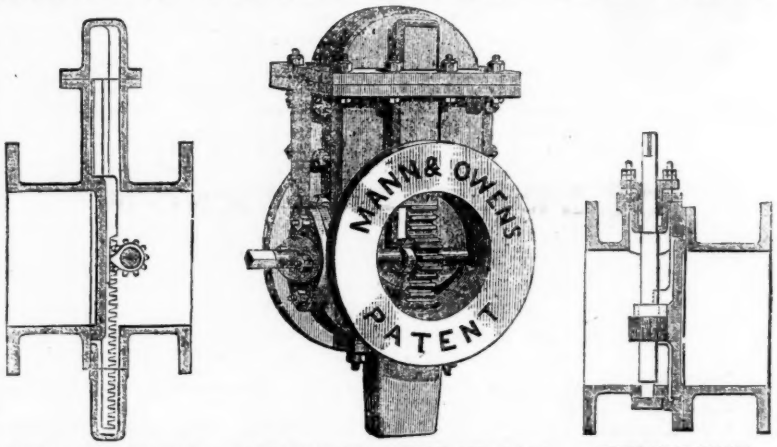


These Engines have been at work a sufficient number of years to prove their durability and efficiency.

One of them has been subjected to a scientific and exhaustive trial to test the consumption of fuel, with the result that an expenditure of less than 2 lbs. of coal per hour developed one indicated horse power.

Full Details of this Trial, and Prices, sent on application to
B. DONKIN & CO., BLUE ANCHOR ROAD, BERMONDSEY, S.E.

MANN & OWENS' PATENT GAS-VALVE.



SECTIONAL ELEVATION. VIEW SHOWING PINION AND RACK. SECTIONAL PLAN.

The advantages of this Patent Valve over all others yet introduced are, that it is always as tight as the best wedge or spring valve, without the possibility of setting fast or becoming suddenly leaky. The surfaces not being in contact during the operation of opening or closing, leakage through wear and tear is avoided.

The Gas Engineer will not fail to see the importance of such a valve in connexion with his purifying apparatus, particularly in the case of large sizes.

The slide being operated either by a screw and nut, or by a pinion and rack, a cam bearing upon a plane, cast on the back of the Valve, forces it against the face, and renders the escape of gas an impossibility. By a slight turn of the pinion or screw, the slide is released, and brought away from the face, by which means friction is avoided, and the only force required to open the Valve is that due to its own weight.

SOLE MANUFACTURERS:
S. OWENS AND CO.,
HYDRAULIC AND GENERAL ENGINEERS,
WHITEFRIARS STREET, LONDON, E.C.
PRICES, SIZES, AND FULL PARTICULARS ON APPLICATION.

J. & J. BRADDOCK,

GAS ENGINEERS,

GLOBE METER-WORKS, OLDHAM,

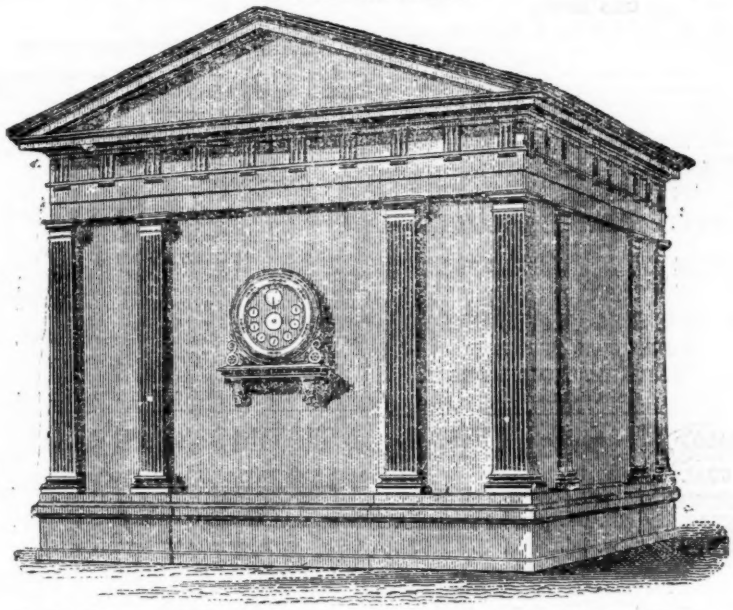
MANUFACTURERS OF

WET & DRY CONSUMERS GAS-METERS

OF THE HIGHEST EXCELLENCE;

ROUND STATION-METERS,

ON CAST-IRON STANDS.



SQUARE STATION-METERS,

WITH PLANED JOINTS.

GOVERNORS, GAUGES, INDICATORS, MAIN COCKS, &c.

GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt.

TERMS, &c., ON APPLICATION.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

4, CANNON ROW, PARLIAMENT STREET, S.W.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress of the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains Illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

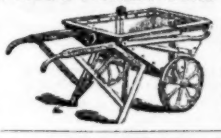
"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan*

WATER-MAINS.

COTTERILL'S PATENT STEEL TUBE-DRILLS, for connecting services to water-mains, *under pressure*, without turning off the water. They drill and tap themselves, and are left in the mains. Made of all sizes, from ¾ to 2 inches and upwards. They cost less than the ordinary plan.

Apply to CHARLES FORSTER COTTERILL, Cannock, STAFFORD, Patentee.

PRICE'S PATENT COKE & COAL BARROW



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

PLUTONIC CEMENT.

(REGISTERED.)

Indispensable to the Profitable Manufacture of Gas.

SOLE MANUFACTURER,

WILLIAM RICHARDSON,

CHARLES HENRY STREET & BISSELL STREET, BIRMINGHAM.

Gas Apparatus of all Descriptions supplied Complete and in Detail.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his

CELEBRATED HALBEATH STEAM COALS,

on Navy List.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

CAFFALL, THOMAS, & CO.,

LIMITED,

Are prepared to supply and erect their

PATENT MOVEABLE SEALS

FOR DIP-PIPES,

Or to grant Licences for the Manufacture and Use of the same.

Particulars may be obtained on application at the Offices,

75, FLEET STREET, LONDON, E.C.

C. & W. WALKER,

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE,

MANUFACTURERS OF

TELESCOPIC AND SINGLE-LIFT

GASHOLDERS,

CAST & WROUGHT IRON GASHOLDER-TANKS,

CONDENSERS, SCRUBBERS, & PURIFIERS.

LONDON: 8, FINSBURY CIRCUS, E.C.

GAS COALS OF THE BEST QUALITY.

J. HACKETT AND CO.,

COALOWNERS AND COLLIERY AGENTS.

OFFICES:

18, BENNETT'S HILL, BIRMINGHAM; 111, WARWICK ST., LEAMINGTON.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

173, ST. VINCENT STREET, GLASGOW.

RUSSEL'S BOGHEAD.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

MUIRKIRK, No. 2, CANNEL

Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing 11 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL

Of every description delivered f.o.b. United Kingdom, or cost freight and insurance Abroad, upon lowest terms.

Contracts undertaken for the Shipment, Insurance, and Delivery Abroad of Plant and Materials for Gas and Water Works, &c.

THOMAS BROCKELBANK & CO.,

Coal Exporters and Ship and Insurance Brokers,

115, LEADENHALL ST., LONDON.

THE EARL OF HUME'S

LESMAHAGOW

MAIN SEAM CANNEL COAL.

CRAIGNETHAN GAS COAL CO.,

LESMAHAGOW, N.B.

Analysis and Price on Application.

WYLAM WOOD COAL COMPANY,

LIMITED,

WYLAM-ON-TYNE.

WYLAM WOOD CANNEL COAL WORKED FROM ABOVE COLLIERY.

Analysis—10,280 cubic feet of gas per ton of Coal, having an Illuminating Power of 26·2 Sperm Candles, and yields 13¼ cwt of Coke per ton of Coal.

PORTS OF SHIPMENT:

TYNE DOCK AND NORTH DOCK, SUNDERLAND.

For prices and further particulars, apply to

UTRICK ALEXANDER RITSON,

6, QUEEN STREET,

NEWCASTLE-ON-TYNE.

LEE and JERDEIN,

COAL OWNERS & MERCHANTS.

Chief Office:

9, LANCASTER PLACE, STRAND, LONDON, W.C.

SOLE VENDORS FOR

LONDON & THE SOUTHERN COUNTIES

OF

WIGAN COAL AND CANNEL,

From the Mines of the

INCE HALL COAL & CANNEL COMPANY, Limited,

AND

Messrs. W. H. BRANCKER & Co.

TURNBULL, ROTBERG, & CO.,

LEITH.

SHIPPERS OF ALL DESCRIPTIONS OF

GAS AND STEAM COALS.

LONDON AGENT:

Mr. G. A. BARTLEET,

8, UNION COURT, OLD BROAD STREET.

THE

HUCKNALL COLLIERY COMPANY

Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

C. T. GRANT & CO. COAL BROKERS GLASGOW.

Scotch Churls

PRESENT PRICE:

5s. 6d. per Ton at Pit.

8s. 9d. „ F.O.B.

Cubic Feet.	Illuminating Power.	Coke (sup. qual.).
10,000 ..	20 candles. ..	12 cwt.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,

BELFAST.

CANNEL COAL.

COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their

CANNEL FOR GAS-MAKING PURPOSES.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, FLINTSHIRE.

ALEXANDER & HILL,

BARNSLEY,

SUPPLY THE BEST

REAL OLD SILKSTONE

GAS COAL & GAS NUTS.

CONTRACTS ENTERED INTO.

SCOTCH GAS COAL.

ROBERT CRAWFORD & CO.,

GAS AND STEAM COAL MERCHANTS,

STIRLING, N.B.,

Supply and Contract for all the principal Scotch Gas Coal (including BOGHEAD, HARTHILL, CHAPELSIDE, LESMAHAGOW, and BRAEHEAD), f.o.b., or delivered at home or abroad.

ENGLISH AND WELSH COAL AND CANNELS ALSO SUPPLIED.

Analyses and Prices on application.

LONDON AGENT:

JOSEPH MOAKES, 6, WATER LANE, E.C.

THOMAS READ & CO.,

BRAZILIAN IRON-WORKS,

MALTON, YORKS,

MANUFACTURERS OF

GAS and WATER PIPES,

Bends, Tees, and Irregulars,

AND

GENERAL FOUNDERS.

ESTIMATES and PRICES on APPLICATION.

G. J. EVESON,

GAS COAL MERCHANT,

STOURBRIDGE.

Delivery per Rail to any Part.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD,

STRONGLY RECOMMEND A TRIAL OF THEIR

CELEBRATED SILKSTONE GAS NUTS.

Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

APPLICATIONS FOR PRICES, &c., TO BE SENT DIRECT TO THE COLLIERY, AS ABOVE.

THE WIGAN COAL & IRON COMPANY,

LIMITED,

COLLIERY PROPRIETORS,

(HEAD OFFICES: WIGAN, LANCASHIRE; DISTRICT OFFICE: 18, BENNETT'S HILL, NEW STREET, BIRMINGHAM),

WILLIAM M'GOWAN, AGENT,

SUPPLY THE BEST

WIGAN ARLEY MINE SCREENED GAS COAL & NUTS,

THE BEST HAND-PICKED ROUND CANNEL,

ALSO SMALL OR GAS CANNEL, ETC.

The Wigan Coal and Iron Company, Limited, incorporated 1865, are the exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL COLLIERIES.

ALBERT GAS COAL.

THE DERBYSHIRE

SILKSTONE COAL COMPANY,

LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	**10,775**
Weight of coke in lbs. per ton of coal	**1,465**

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

THE LOCHORE AND CAPLEDRAE CANNEL COAL

COMPANY, LIMITED.

Works: LOCHORE by LOCHGELLY, FIFESHIRE. Office: 19, MAITLAND STREET, EDINBURGH.

This Company request attention to the very superior quality of their Cannel Coals.

1. The following are the practical results given by Dr. Wallace, of Glasgow, of analyses of their Lochore and Capledrae Cannels:—

	Sample worked at Capledrae.		Sample worked at Lochore.
Gas per ton of coal, at 60° Fahr. and 30 inches barometric pressure	13,095 cubic feet.	..	11,760 cubic feet.
Illuminating power, in standard sperm candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	32·91	..	34·83
Value of 1 cubic foot of gas in grains of sperm	780	..	836
Equivalent of a ton of coal in pounds of sperm candles	1,459	..	1,404
Durability of 1 cubic foot by 5-inch flame	69 minutes.	..	71 minutes.
Gravity of the gas (air = 1000)	596	..	594

Remarks.—This (the sample from Capledrae) is a Cannel Coal of first-class quality, giving 13,000 feet of 33-candle gas. It contains only a minute proportion of sulphur, and the ash is almost quite white. The coke is of rather inferior quality.

Remarks on Sample from Lochore.—This is a Cannel Coal of first-class quality, giving a large yield of very rich gas and a coke of medium quality.

2. The following are the practical results of analyses by Dr. Wallace of the Company's Waverley Cannels:—

	Capledrae Waverley.		Lochore Waverley.
Gas per ton of coal, at 60° Fahr. and 30 inches barometer	9,120 cubic feet.	..	11,145 cubic feet.
Illuminating power, in standard candles, by union jet consuming 5 cubic feet per hour, at ·5-inch pressure	36·62	..	33·09
Value of 1 cubic foot of gas in grains of sperm	878	..	794
Equivalent of a ton of coal in pounds of sperm candles	1,145	..	1,264
Durability of 1 cubic foot of gas by 5-inch flame	80 minutes.	..	67 minutes.
Gravity of the gas (air = 1000)	677	..	597

Remarks on the Sample of Capledrae Waverley.—This Coal gives fully 9000 feet of gas of 36½ candles, and is admirably adapted for bringing up the quality of gas made from common coal or inferior qualities of cannel. The tests were made at a rather high temperature, this being one of the coals that stand a very high heat without serious diminution of the illuminating power of the gas The coke contains 60 per cent. of ash, and is therefore almost valueless, but the proportion of sulphur is very moderate.

Remarks on the Lochore Waverley.—This is a first-class Cannel Coal, giving 11,000 cubic feet of 33-candle gas. The quantity of sulphur is very minute, and the ash is nearly white. The coke is of inferior quality, but not wholly valueless.

Applications for full Copies of Analyses and Prices may be made to the Company, at

19, MAITLAND STREET, EDINBURGH.

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS.

LONDON, 1851;
NEW YORK, 1853;
PARIS, 1855.

(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

MANUFACTURED ONLY BY

PRIZE MEDALS.

LONDON, 1862;
DUBLIN, 1865;
PARIS, 1867

THE GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT & CO.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS

Of the highest excellence.

STATION-METERS AND GOVERNORS.

STREET-LAMP REGULATORS.

TESTING APPARATUS

Of the most perfect description for all purposes relating to Gas.

"GAS MEASUREMENT AND GAS-METER TESTING," by F. W. HARTLEY, A. Inst. C.E.
Third Edition, cloth boards, 2s.; per post, 2s. 2d.

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.

R. LAIDLAW AND SON,

EDINBURGH AND **GLASGOW.**

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

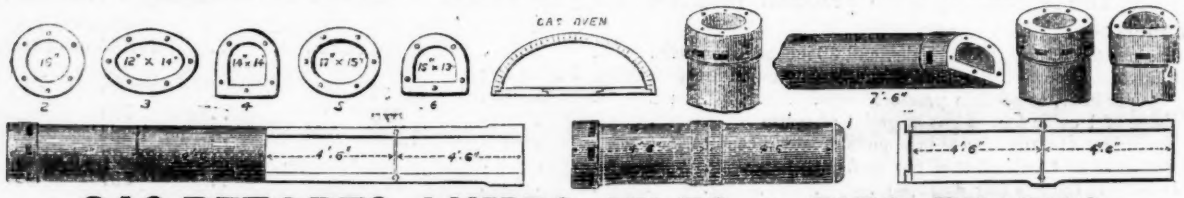
STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges,
Governors, Test Holders, &c., &c.

LONDON OFFICE: 106, CANNON STREET, E.C.

HARRIS & PEARSON,

FIRE-CLAY AND BRICK WORKS, STOURBRIDGE.



GAS-RETORTS, LUMPS, TILES, & FIRE-BRICKS,

OF EVERY DESCRIPTION.

A LARGE ASSORTMENT OF GAS-RETORTS IN STOCK.

STOCK FOR EXPORT READY AT THE WORKS, AND AT ELLESMERE PORT.

London: Printed by WILLIAM BOTHERTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, July 27, 1875.